

SEQUENCE LISTING

<110> The University of York
Ian Graham

<120> Desaturase Enzymes

<130> 2902076.4

<140> 10/597,998

<141> 2007-06-18

<150> 0403452.6

<151> 2004-02-17

<150> 0407807.7

<151> 2004-04-06

<160> 38

<170> PatentIn version 3.3

<210> 1

<211> 477

<212> PRT

<213> *Thalassiosira pseudonana*

<400> 1

Met Asp Phe Leu Ser Gly Asp Pro Phe Arg Thr Leu Val Leu Ala Ala
1 5 10 15

Leu Val Val Ile Gly Phe Ala Ala Ala Trp Gln Cys Phe Tyr Pro Pro
20 25 30

Ser Ile Val Gly Lys Pro Arg Thr Leu Ser Asn Gly Lys Leu Asn Thr
35 40 45

Arg Ile His Gly Lys Leu Tyr Asp Leu Ser Ser Phe Gln His Pro Gly
50 55 60

Gly Pro Val Ala Leu Ser Leu Val Gln Gly Arg Asp Gly Thr Ala Leu
65 70 75 80

Phe Glu Ser His His Pro Phe Ile Pro Arg Lys Asn Leu Leu Gln Ile
85 90 95

Leu Ser Lys Tyr Glu Val Pro Ser Thr Glu Asp Ser Val Ser Phe Ile
100 105 110

Ala Thr Leu Asp Glu Leu Asn Gly Glu Ser Pro Tyr Asp Trp Lys Asp
115 120 125

Ile Glu Asn Asp Asp Phe Val Ser Asp Leu Arg Ala Leu Val Ile Glu
130 135 140

His Phe Ser Pro Leu Ala Lys Glu Arg Gly Val Ser Leu Val Glu Ser
145 150 155 160

Ser Lys Ala Thr Pro Gln Arg Trp Met Val Val Leu Leu Leu Leu Ala
Page 1

165 170 175

Ser Phe Phe Leu Ser Ile Pro Leu Tyr Leu Ser Gly Ser Trp Thr Phe
180 185 190

Val Val Val Thr Pro Ile Leu Ala Trp Leu Ala Val Val Asn Tyr Trp
195 200 205

His Asp Ala Thr His Phe Ala Leu Ser Ser Asn Trp Ile Leu Asn Ala
210 215 220

Ala Leu Pro Tyr Leu Leu Pro Leu Leu Ser Ser Pro Ser Met Trp Tyr
225 230 235 240

His His His Val Ile Gly His His Ala Tyr Thr Asn Ile Ser Lys Arg
245 250 255

Asp Pro Asp Leu Ala His Ala Pro Gln Leu Met Arg Glu His Lys Ser
260 265 270

Ile Lys Trp Arg Pro Ser His Leu Asn Gln Thr Gln Leu Pro Arg Ile
275 280 285

Leu Phe Ile Trp Ser Ile Ala Val Gly Ile Gly Leu Asn Leu Leu Asn
290 295 300

Asp Val Arg Ala Leu Thr Lys Leu Ser Tyr Asn Asn Val Val Arg Val
305 310 315 320

Glu Lys Met Ser Ser Ser Arg Thr Leu Leu His Phe Leu Gly Arg Met
325 330 335

Leu His Ile Phe Val Thr Thr Leu Trp Pro Phe Leu Ala Phe Pro Val
340 345 350

Trp Lys Ala Ile Val Trp Ala Thr Val Pro Asn Ala Ile Leu Ser Leu
355 360 365

Cys Phe Met Leu Asn Thr Gln Ile Asn His Leu Ile Asn Thr Cys Ala
370 375 380

His Ala Ser Asp Asn Asn Phe Tyr Lys His Gln Val Val Thr Ala Gln
385 390 395 400

Asn Phe Gly Arg Ser Ser Ala Phe Cys Phe Ile Phe Ser Gly Gly Leu
405 410 415

Asn Tyr Gln Ile Glu His His Leu Leu Pro Thr Val Asn His Cys His
420 425 430

Leu Pro Ala Leu Ala Pro Gly Val Glu Arg Leu Cys Lys Lys His Gly
435 440 445

Val Thr Tyr Asn Ser Val Glu Gly Tyr Arg Glu Ala Ile Ile Ala His
450 455 460

Phe Ala His Thr Lys Asp Met Ser Thr Lys Pro Thr Asp
465 470 475

<210> 2
<211> 2914
<212> DNA
<213> *Thalassiosira pseudonana*

<220>
<221> misc_feature
<222> (274)..(274)
<223> n is a, c, g, or t

<400> 2
cggaggcgcg actggagagg ttcccgagg ttgatgtaa ttggagggtg ggtcaaatac 60
agattctgcc ctaacatttt ccggaaattg gcttcagttt gattcaagcg aggaggcgct 120
cggcaggagg gcccgtcacc ttttgcata ttgggactt caatggtttc tacattttt 180
cctttctgga acccaaacgc tgtcctcaa ttctcctcc catactcacg gatggatccc 240
cgaaaatgcc accaccaatc accctgtca atcncaaacc tcgtcatcct tcacattttc 300
ttagcaccat tgccgggtgt acccttcccc gcgactgcca gtctatgggt cagtatatct 360
cccacatttg gagagggtatt gctaaaacgt gtcaatcata catatgataa ctggagagtg 420
cacacgaaga gatcaatgct tgagctagga ggggtggctat tggctgtgag cggcagcttt 480
cacttaagat attacggcac ggcaagtcta ctgcacaata caaccgatgc tgcaggttta 540
tgcaatagct caagtgtat caacaacaaa acgtgcgaga atgacgacag tgcttacgaa 600
gatgatgcca tgagagctgt ttgggcattg ctatgggcgt tgcagctggg aacgttggtc 660
ggttgtgcgt tagtgtagg agtgcacat ttcagtggag ataacctgac caaacaatct 720
gcgataccaa caaatcttc aaaagcaaag ccaatatctg atcaaaaagc agctgtgaca 780
tccggcagta cctgcgctgt gagagagaag gcacgaaaag acggtctagt actcctcgat 840
ggcaactggt acaacgttga aaagttcgtc catcatcatc ctggagggtg agaagtgtg 900
gagcagtatc tcggggcaga tatctcgttt gtgttagag tgatgcatag aaatccaact 960
caaatcatga aatatcgcaa gccggtacga gctgccaccc cagaagaact tgaggctctc 1020
acaagccgcc gtcaagaggt ttgtcttgat atgatggacg actttgttac caattccatt 1080
gatatcgctt ctccagaaat gcttccaag ccaacgcagt ttgacctgaa gtcatttgag 1140
aaggacttca ttgacttata tgaagagttt gttgctcagg gatacttcaa gccctcaaca 1200
acatggctac tctggaacac agcggctactg attagatca tcgcgttatc tgtcatctca 1260
atgaaagtgc taccaccaac ttcgltgtc ctacctggag cattgcttgg tctcttttgg 1320
caccaaagtg gattcctcat gcacgatgcc gagcaccata atttggttg aaacgaacgg 1380
ctgaatgaca ttttgggtg gatctatggc actgtcttct tgggtgtcaa tggcgcttgg 1440
tggagagagg agcatagaga acatcatgct ttctcaaca ctacgatga tgaaagtgg 1500

ttcaaagatc cccaggtgtg tcagcgtcac ttagacgac ttcaaagta ctgttcctc 1560
 tcgttgctca cacattcgat ttattcatt cactcacaga tgagagagga cgtctggata 1620
 cagaacaaga agttgattcc gttctcggg gacgagatca ttcatftctt aacaaacttt 1680
 cagcacattc tgttcctcc gatcatcttt atcgttggcc gcgttggat tgtcgtagat 1740
 tctacactga ctgagaggaa gttccgtcct tggagtaagt gtcaattggg attcattgag 1800
 aaggaactgc tgattgact ttacatactaa ctaactgcat cgccacttca tcacgacgat 1860
 agcaatactt ggtaatgttt gtcatactct actacactac gcaatcttat ctcagacgag 1920
 tcgtcctatc cccgtgtaca tcacggctc tcttggcaa gctattctct ctttgaatt 1980
 gcttgggaat cactacgtca agccttgga tagactcaac gatgccacag agggaaactt 2040
 ctgcgtttgg cagatactaa gcactcaaga cttgcatgt ccacgttggg ctgcgtggct 2100
 gtacggaggt ctcaacttc actattccca tcactattc ccaacgttgt ctgagagta 2160
 ctttcacatt acatcaccac gcattcgggt gagtgctcgt gtttagtgt gctacattca 2220
 tatcaatgat actcatagct ccatttctt cgacagagac tatgtgagaa gcacgggctt 2280
 ccgtttattg agattgcgtt cattgattgc gttgttgaa tggtaacaa cttaacgaa 2340
 gtgaggaaag acttcgtac gaaaggccac gggagtgtgg cttcatgta cacgtgatct 2400
 taagtgtcga gacgatatag aggttgatat ttactgttt gtcaccagta gttcgtctaa 2460
 tatgatgtag caaccgcagc ttgtggaatt agtttagtgt actatgtaac tgaaaaagtt 2520
 acgtcgatct actctctgca catctacatc gtgtgaagcc attccgttca agaagtatcc 2580
 taatccctcg aaccaaacag tctcgtccta taccatcat taatcagccg cctctaccg 2640
 atgttgctgt tgttcgggt gctcgtgaac ccctcgcg cccgataatg gcgaagggca 2700
 gtcggacact tgataatct cttcacagag ttatgagct ggggtttgt accaatacct 2760
 cctttatatg gtactaatgg acccgtgtcc attattgctt ggccgcgttt ccaccgttg 2820
 gaccgatagg tggccaaagg cccacacaga agagcaccat aaaggcgag ccttgaggaa 2880
 actcaagaaa ccccgatggg ccacgtatta aaac 2914

<210> 3
 <211> 1551
 <212> DNA
 <213> *Thalassiosira pseudonana*

<400> 3
 atggctagag ctgtttgggc attgctatgg gcgttcagc tgggaacgtt ggtcgggtgt 60
 gcgttagtgt taggagtgc tcatctcagt ggagataacc tgaccaacaa atctgcgata 120
 ccaacaaaat ctcaaaagc aaagccaata tctgatcaaa aagcagctgt gacatccggc 180
 agtacctcgc ctgtgagaga gaaggcacga aaagacggtc tagtactcct cgatggcaac 240
 tggtaacaag ttgaaaagtt cgtccatcat catcctggag gtgtagaagt gttggagcag 300
 tacctcgggg cagatatctc gtttgtttt agagtgatgc atagaaatcc aactcaaact 360
 atgaaatatc gcaagccggg acgagctgcc acccagaag aacttgaggc tctcacaagc 420

cgccgtcaag aggtttgtct tgatatgatg gacgactttg ttaccaattc cattgatatc 480
gcttctccag aaatgctcc caagccaacg cagtttgacc tgaagtcatt tgagaaggac 540
ttcattgact tatatgaaga gtttgtgtct cagggatact tcaagccctc aacaacatgg 600
ctactctgga acacagcggg actgattagt atcatcgcggt tatctgtcat ctcaatgaaa 660
gtgctaccac caacttcgtt tgcctacct ggagcattgc ttggtctctt ttggcaccaa 720
agtggattcc tcatgcacga tgccgagcac cataatttgg ctggaaacga acggctgaat 780
gacattttgg gttggatcta tggcactgtc ttcttgggtg tcaatggcgc ttggtggaga 840
gaggagcata gagaacatca tgcttcctc aacacttacg atgatgaaag tggttcaaa 900
gatccccaga tgagagagga cgtctggata cagaacaaga agttgattcc gttcttcggt 960
gacgagatca ttcatctctt aacaaacttt cagcacattc tgttcttcc gatcatcttt 1020
atcgttggcc gcgttggtat tgcgtagat tctacactga ctgagaggaa gttccgtcct 1080
tggacaatac ttggaatgt ttgtcatac ctactacact acgcaatctt atctcagacg 1140
agtcgtcta tccccgtga catcatcggc tctcttggc aagctattct ctcttgcaa 1200
ttgcttggga atcactacgt caagccttgg aatagactca acgatgccac agagggaaac 1260
ttctgcgttt ggcagatact aagcactcaa gactttgcat gtccacgttg gtctcggtagg 1320
ctgtacggag gtctcaactt tcaactatcc catcatctgt tcccaacgtt gtctagagag 1380
tactttcaca ttacatcacc acgcattcgg agactatgtg agaagcacgg gcttccgttt 1440
attgagattg cgtttattga ttgcgttgtt ggaatgtgtca acaactttaa cgaagtgagg 1500
aaagacttcg ctacgaaagg ccacggggagt gtggctttca tgtacacgtg a 1551

<210> 4
<211> 516
<212> PRT
<213> *Thalassiosira pseudonana*

<400> 4

Met Ala Arg Ala Val Trp Ala Leu Leu Trp Ala Leu Gln Leu Gly Thr
1 5 10 15

Leu Val Gly Cys Ala Leu Val Leu Gly Val His His Phe Ser Gly Asp
20 25 30

Asn Leu Thr Lys Gln Ser Ala Ile Pro Thr Lys Ser Ser Lys Ala Lys
35 40 45

Pro Ile Ser Asp Gln Lys Ala Ala Val Thr Ser Gly Ser Thr Cys Ala
50 55 60

Val Arg Glu Lys Ala Arg Lys Asp Gly Leu Val Leu Leu Asp Gly Asn
65 70 75 80

Trp Tyr Asn Val Glu Lys Phe Val His His His Pro Gly Gly Val Glu
85 90 95

Val Leu Glu Gln Tyr Leu Gly Ala Asp Ile Ser Phe Val Phe Arg Val
100 105 110

Met His Arg Asn Pro Thr Gln Ile Met Lys Tyr Arg Lys Pro Val Arg
115 120 125

Ala Ala Thr Pro Glu Glu Leu Glu Ala Leu Thr Ser Arg Arg Gln Glu
130 135 140

Val Cys Leu Asp Met Met Asp Asp Phe Val Thr Asn Ser Ile Asp Ile
145 150 155 160

Ala Ser Pro Glu Met Leu Pro Lys Pro Thr Gln Phe Asp Leu Lys Ser
165 170 175

Phe Glu Lys Asp Phe Ile Asp Leu Tyr Glu Glu Phe Val Ala Gln Gly
180 185 190

Tyr Phe Lys Pro Ser Thr Thr Trp Leu Leu Trp Asn Thr Ala Val Leu
195 200 205

Ile Ser Ile Ile Ala Leu Ser Val Ile Ser Met Lys Val Leu Pro Pro
210 215 220

Thr Ser Phe Val Leu Pro Gly Ala Leu Leu Gly Leu Phe Trp His Gln
225 230 235 240

Ser Gly Phe Leu Met His Asp Ala Glu His His Asn Leu Ala Gly Asn
245 250 255

Glu Arg Leu Asn Asp Ile Leu Gly Trp Ile Tyr Gly Thr Val Phe Leu
260 265 270

Gly Val Asn Gly Ala Trp Trp Arg Glu Glu His Arg Glu His His Ala
275 280 285

Phe Leu Asn Thr Tyr Asp Asp Glu Ser Gly Phe Lys Asp Pro Gln Met
290 295 300

Arg Glu Asp Val Trp Ile Gln Asn Lys Lys Leu Ile Pro Phe Phe Gly
305 310 315 320

Asp Glu Ile Ile His Phe Leu Thr Asn Phe Gln His Ile Leu Phe Leu
325 330 335

Pro Ile Ile Phe Ile Val Gly Arg Val Gly Ile Val Val Asp Ser Thr
340 345 350

Leu Thr Glu Arg Lys Phe Arg Pro Trp Thr Ile Leu Gly Asn Val Cys
355 360 365

His Ile Leu Leu His Tyr Ala Ile Leu Ser Gln Thr Ser Arg Pro Ile
370 375 380

Pro Val Tyr Ile Ile Gly Ser Leu Trp Gln Ala Ile Leu Ser Leu Gln
 385 390 395 400

 Leu Leu Gly Asn His Tyr Val Lys Pro Trp Asn Arg Leu Asn Asp Ala
 405 410 415

 Thr Glu Gly Asn Phe Cys Val Trp Gln Ile Leu Ser Thr Gln Asp Phe
 420 425 430

 Ala Cys Pro Arg Trp Ser Arg Trp Leu Tyr Gly Gly Leu Asn Phe His
 435 440 445

 Tyr Ser His His Leu Phe Pro Thr Leu Ser Arg Glu Tyr Phe His Ile
 450 455 460

 Thr Ser Pro Arg Ile Arg Arg Leu Cys Glu Lys His Gly Leu Pro Phe
 465 470 475 480

 Ile Glu Ile Ala Phe Ile Asp Cys Val Val Gly Met Val Asn Asn Phe
 485 490 495

 Asn Glu Val Arg Lys Asp Phe Ala Thr Lys Gly His Gly Ser Val Ala
 500 505 510

 Phe Met Tyr Thr
 515

<210> 5
 <211> 1900
 <212> DNA
 <213> *Thalassiosira pseudonana*

<220>
 <221> misc_feature
 <222> (1)..(1)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (3)..(3)
 <223> n is a, c, g, or t

<400> 5
 nanccatatg cggaatacgc gccagggtat acccacagcg cctccgttgc agcaaactcc 60

 tatccaatac ctcccatga acccccctt cgccaccct atatgcgaga ctggtcgtc 120

 tggacctgca gatgatgact ggtgaggcca aattagtgg gaatgcgtgc agatggaggc 180

 cttattcttt tgcaatcagg ggcgtcgtca agaggagatc catgtgttg tgtgattcga 240

 cttgcttggg gcgtgcatga tgtgtcgtg cgtgtacgat gttgataggt agaaagagat 300

 cgaggcgggtg attcaactat tcaggatact gaaagagttg atatgcagc agtaatatat 360

 cctagtgtt tgtgtttgtg ttgtggtgta tcaagtattc aatgacgcaa caataacgtt 420

 ggtagtgtat ggggaacag gtgttcggga caaaggcttt tcataaaatc tatttaacgt 480

gttcgttaaa acgacgaaaa gaagccactc tgcaccattc cagcgcagac aagaccagca 540
 ggacagaaac agcagcagac accgacccga gccgaaaaag ccaacaacaa cgacaccgac 600
 ccgagccgat acagccgaca ggcaaaggct ctctgtaca atctacaaa cggaacatc 660
 aaatcatgcc accctcatc aaagacacac tcgacgagcc ctctgtctcg cccgcatcca 720
 ccaagtgcc caccacaaa cccctctcc cccgccgaa acccctcaa cgatactccc 780
 cctcccaaat ctcccaacac aacactccca ccgatgcatg gctcatttac aaatcccaag 840
 tccttgacat ttccaaatgg atatgcacc atccagggtg agagcagacg ctgttgaggt 900
 ttgccggtat ggatgctacc gatgaattga gggcatttca tgatgattgg gtttggagg 960
 agaagttgcc tcatcttgat attggggagg tggattggac tactaccggc ggggcagaga 1020
 atactgtcac gaaggatgga cagggttcgg agcttatcaa ggatttcaga gagttgggtg 1080
 aacacttga cagggtgggg tactttcacg tcagtccatg gtattacgtc cgtaagggtg 1140
 ctaccgtctt cgccatctt ggatgtgcac tcggactcct ctcaatacc gattccatcc 1200
 cagcacacat gctcgcggcg gtactcctcg gtatattctg gcaacaatt gcattcgtcg 1260
 gacatgactg tggtcacatg tcggcgcgga ctcatgccg tgatcatac gatgtaccta 1320
 agctgggagc actggtgacc ttctcaatg ggatttcgg agcgtgggtg aaggctacgc 1380
 acaatgttca tcagtcttg ccaaatagtg ttgattgtga cccggacatt gctcatttgc 1440
 cgggtgttgc gttgcatgag cacatgttta cgtcgttgtt taacaagtat catgggaggg 1500
 tgatggagtt tgattggctg gcgcgtaatg tcttgtgcc attcaacac ttttggtact 1560
 atcccataat ggccgtggcg aggttcaatc tgtacattca atcagcattg ttttggcgt 1620
 cgaagaacga tgggcatgca ggaagaagg gatcctctag attggattg ctggcgttca 1680
 atcgtgttct tctgttgtt agcgggtgctg gtgtcatgca tcccgagctg ggcggagcgt 1740
 atcgattcgt tctcgtcag acatgctgta cctgggttac tgcatgtgca atcacctgtc 1800
 gccttctct ggacaatct gatccacaa gaggaccgg ttgggtgct cttccgaag 1860
 cccggttctg ggcttttgc acattggcgt cccgggtcca 1900

<210> 6
 <211> 411
 <212> PRT
 <213> *Thalassiosira pseudonana*

<400> 6

Met Pro Pro Ser Ile Lys Asp Thr Leu Asp Glu Pro Phe Val Ser Pro
 1 5 10 15

Ala Ser Thr Lys Ser Pro Thr Thr Lys Pro Leu Leu Pro Arg Arg Lys
 20 25 30

Pro Leu Lys Arg Tyr Ser Pro Ser Gln Ile Ser Gln His Asn Thr Pro
 35 40 45

Thr Asp Ala Trp Leu Ile Tyr Lys Ser Gln Val Leu Asp Ile Ser Lys
 Page 8

50 55 60
 Trp Ile Ser His His Pro Gly Gly Glu Gln Thr Leu Leu Arg Phe Ala
 65 70 75 80
 Gly Met Asp Ala Thr Asp Glu Leu Arg Ala Phe His Asp Asp Trp Val
 85 90 95
 Leu Glu Glu Lys Leu Pro His Phe Val Ile Gly Glu Val Asp Trp Thr
 100 105 110
 Thr Thr Gly Gly Ala Glu Asn Thr Val Thr Lys Asp Gly Gln Val Ser
 115 120 125
 Glu Leu Ile Lys Asp Phe Arg Glu Leu Gly Glu His Phe Asp Arg Leu
 130 135 140
 Gly Tyr Phe His Val Ser Pro Trp Tyr Tyr Val Arg Lys Val Ala Thr
 145 150 155 160
 Val Phe Ala Ile Phe Gly Cys Ala Leu Gly Leu Leu Phe Asn Thr Asp
 165 170 175
 Ser Ile Pro Ala His Met Leu Ala Ala Val Leu Leu Gly Ile Phe Trp
 180 185 190
 Gln Gln Phe Ala Phe Val Gly His Asp Cys Gly His Met Ser Ala Arg
 195 200 205
 Thr His Ala Arg Asp His Ile Asp Val Pro Lys Leu Gly Ala Leu Val
 210 215 220
 Thr Phe Phe Asn Gly Ile Ser Val Ala Trp Trp Lys Ala Thr His Asn
 225 230 235 240
 Val His His Ala Val Pro Asn Ser Val Asp Cys Asp Pro Asp Ile Ala
 245 250 255
 His Leu Pro Val Phe Ala Leu His Glu His Met Phe Thr Ser Leu Phe
 260 265 270
 Asn Lys Tyr His Gly Arg Val Met Glu Phe Asp Trp Leu Ala Arg Asn
 275 280 285
 Val Phe Val Pro Phe Gln His Phe Trp Tyr Tyr Pro Ile Met Ala Val
 290 295 300
 Ala Arg Phe Asn Leu Tyr Ile Gln Ser Ala Leu Phe Leu Ala Ser Lys
 305 310 315 320
 Asn Asp Gly His Ala Gly Arg Arg Gly Ser Ser Arg Leu Asp Leu Leu
 325 330 335

Ala Phe Asn Arg Val Leu Leu Leu Val Ser Gly Ala Gly Val Met His
340 345 350

Pro Glu Leu Gly Gly Ala Tyr Arg Ile Arg Leu Arg Gln Thr Cys Cys
355 360 365

Thr Trp Val Thr Ala Cys Ala Ile Thr Cys Arg Leu Leu Leu Asp Asn
370 375 380

Leu Asp Pro Thr Arg Gly Pro Gly Trp Gly Ala Leu Ser Glu Ala Arg
385 390 395 400

Phe Trp Ala Phe Ala Thr Leu Ala Ser Arg Val
405 410

<210> 7
<211> 1913
<212> DNA
<213> *Thalassiosira pseudonana*

<220>
<221> misc_feature
<222> (3)..(3)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (1800)..(1800)
<223> n is a, c, g, or t

<400> 7
canctaaccg ggaagagggc cttattgcc accacagtga taacctcgg ctgtgaccac 60
gggagcagcc gtggcgagcc cgcgtctgac cagccctgtc ttttgagc atccctcacc 120
acacatcgca tctcgttgca cggggatcag tgcacagtct tcgtctcatt gttagatgta 180
cacgcgaaga agcacatcca gcccgactct tcataacatc tcaggaccct gcaaacacgc 240
atcacatcat gatgtccac cgagtcgtca tcggcatcgc cctcacaatg ggctgtgtct 300
ccagtttctc ctgcccggc cattcaatat tggcacgtcc tatgcaatca tccaccactt 360
ctcgtttctc gacaatgatt gaaaagtcag agatttctga cagtgtaac aacgaaaaca 420
aggagatgac atcatctct gaaatgccta ctgctggga atgcaatgag gaagctgagt 480
gcgtggaagt tctgcttgt gatgacgagg aatgccgtac tactttggat gtgaggattc 540
atggcaaatg gtacgatctt tcaggtgagt gcaagttgtg gtatgcattg ttataagttc 600
tattctgtat cggcacacac gatatttgtt tgtgatcaat gttctaacag ccatttgttc 660
ctcctacttc ctaggatgg cgaaagctc accctgcagg acccactgg atcgactggt 720
acgacggctg tgacgccacc gaagtcattg acgcatttca cacccaaaaa ggacgtgaaa 780
tgtacaagcg tcttcccgcg tctgccccg aaacggctgc cgttcttgaa gcatctgcag 840
caccttactc gcagacggag ctaacttta ggaagttgag ggatcaattg gaaagtgagg 900
ggtggtggga gagggacttt gtccatgagg gaaagttgct ggcgatttgg gcatcgttgg 960

ttacaggagc agcattgact gcggagagtg ctctctctct tcaactttc ttgtgggat 1020
 tgtctatgac gaatgctgga tgggtggggc atgattatat tcatggtgtt gataagttca 1080
 gtcaagttat gaggcctttt gctgccgtgg ctgctggttt gggaccaact tggaggagtg 1140
 ataagcacia caagcatcac gctttgagtg agtctgactc ttgtgttac tgcaagtgtg 1200
 gtttaaagat tgaatcaata ccatcgtact catactctca acattcttc aatcgcaaca 1260
 gccaacgaaa tgggagttga tgaagacatt gcgaccgatc catttctct tcttatgtc 1320
 ccggatccaa agtacgattc tccactcgt aagatccaac actacatctt ctacagtccc 1380
 ttctcttcc tctttgccct ctggcgctg gacacccta aggtcgccgt agactcagtt 1440
 gaatcgaaac gtcccgatgc aaagaatgaa ttgtgtatc tctggcaca ttactcgtc 1500
 ttgttgacct tctccagc tcagggtgtg gtgcctgctg tcttctctc tggcctcatg 1560
 tctgcactca ttgtactcc gacacatcag tcggaagagt atttgagga gtatcagcct 1620
 gattgggtga cggctcagtt tgagagcacg agaaatgctg tcacgactaa tccattctt 1680
 gagtggcttt ggggaggaat gcaataccag ttggagcatc actgttccc ttcatgccc 1740
 aggtaagcag cttaatgttt gtatcttga ccatgttga cttctcgtc tcggctaach 1800
 ctgttgaag cgtatgagcc tagcacataa tgggtgtgtat gcgaccatga actcgattta 1860
 aggttcaaat accttactat catctcagtc cggtgccgga tgacgtgtgt ccc 1913

<210> 8
 <211> 389
 <212> PRT
 <213> Thalassiosira pseudonana

<400> 8

Gln Pro Phe Val Pro Pro Thr Ser Ser Gly Trp Arg Lys Ala His Pro
 1 5 10 15

Ala Gly Pro His Trp Ile Asp Trp Tyr Asp Gly Arg Asp Ala Thr Glu
 20 25 30

Val Met Asp Ala Phe His Thr Gln Lys Gly Arg Glu Met Tyr Lys Arg
 35 40 45

Leu Pro Ala Ser Ala Pro Glu Thr Ala Ala Val Leu Glu Ala Ser Ala
 50 55 60

Ala Pro Tyr Ser Gln Thr Glu Leu Asn Phe Arg Lys Leu Arg Asp Gln
 65 70 75 80

Leu Glu Ser Glu Gly Trp Trp Glu Arg Asp Phe Val His Glu Gly Lys
 85 90 95

Leu Leu Ala Ile Trp Ala Ser Leu Val Thr Gly Ala Ala Leu Thr Ala
 100 105 110

Glu Ser Ala Pro Pro Leu Ser Thr Phe Leu Leu Gly Leu Ser Met Thr
 115 120 125

Asn Ala Gly Trp Leu Gly His Asp Tyr Ile His Gly Val Asp Lys Phe
130 135 140

Ser Gln Val Met Arg Pro Phe Ala Ala Val Ala Ala Gly Leu Gly Pro
145 150 155 160

Thr Trp Trp Ser Asp Lys His Asn Lys His His Ala Leu Ser Glu Ser
165 170 175

Asp Ser Cys Cys Tyr Cys Lys Cys Gly Leu Lys Ile Glu Ser Ile Pro
180 185 190

Ser Tyr Ser Tyr Pro Gln His Ser Phe Asn Arg Asn Ser Gln Arg Asn
195 200 205

Gly Ser Arg Leu Asn Gln Tyr His Arg Thr His Ile Leu Asn Ile Leu
210 215 220

Ser Ile Ala Thr Ala Asn Glu Met Gly Val Asp Glu Asp Ile Ala Thr
225 230 235 240

Asp Pro Phe Leu Phe Pro Tyr Val Pro Asp Pro Lys Tyr Asp Ser Pro
245 250 255

Leu Arg Lys Ile Gln His Tyr Ile Phe Tyr Ser Pro Phe Ser Phe Leu
260 265 270

Phe Ala Leu Trp Arg Val Asp Thr Leu Lys Val Ala Val Asp Ser Val
275 280 285

Glu Ser Lys Arg Pro Asp Ala Lys Asn Glu Leu Trp Tyr Leu Leu Ala
290 295 300

His Tyr Phe Val Leu Leu Thr Phe Phe Pro Ala Gln Val Trp Val Pro
305 310 315 320

Ala Val Phe Leu Ser Gly Leu Met Ser Ala Leu Ile Val Thr Pro Thr
325 330 335

His Gln Ser Glu Glu Tyr Phe Glu Glu Tyr Gln Pro Asp Trp Val Thr
340 345 350

Ala Gln Phe Glu Ser Thr Arg Asn Ala Val Thr Thr Asn Pro Phe Ser
355 360 365

Glu Trp Leu Trp Gly Gly Met Gln Tyr Gln Leu Glu His His Leu Phe
370 375 380

Pro Ser Met Pro Arg
385

<210> 9
<211> 2689
<212> DNA
<213> *Thalassiosira pseudonana*

<220>
<221> misc_feature
<222> (14)..(17)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (2687)..(2687)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (2689)..(2689)
<223> n is a, c, g, or t

<400> 9
aaaaaaaaaa aaannnnggg aagcgagatc aatcgagctg gtacatgag ttcaaaagt 60
caacttcaac attcaagttg tacaaaagag agggcctcag acgtggtgag caaaagcact 120
tcacagggga atagtagggg aaaaacagaa atatttgga aatttatctt agttcctgat 180
tatatcttca attactaaag ggaaaacaat gcagctcaaa agctacgttt gtgtacttct 240
ttgaaaccac ctacccccg cggcttcgcg tccgggtcgg cccgcttgca tcctttcttc 300
ctctcacaat ttatcatcca acgagctgat aacgtgtcat ttacagggt caacacaata 360
aaacatacta atcaaccatg ggaaaaggag gagacgcagc cgcagccacc aagcgtagtg 420
gagcattgaa attggcggag aagccgcaga agtacacctg gcaggagggtg aagaagcacg 480
tgagtctccg cttgtgttgc tgccgttga tgctctgtc gttggttcgg attatgcaac 540
gagagtctgt attgcaactc aatttcaatt gtccatctgc aatcaactca tctgacccaa 600
caacttctgc caccgtccac ccattcagat ccccccgac gatgcctggg tagtccacca 660
aaacaaagtc tacgacgtct ccaactggta cgaccacccc ggtggagccg tgggtgtcac 720
ccacgccgga gacgacatga cggacatctt cgccgccttc cagccccaag gctctcaggc 780
catgatgaag aagttttaca ttggagattt gattccggag agtgtggagc ataaggatca 840
aagacagttg gatttcgaga agggatatcg tgatttacgg gccaagcttg tcatgatggg 900
gatgttcaag tcgagtaaga tgtattatgc atacaagtgc tcgttcaata tgtgcatgtg 960
gttggtggcg gtggccatgg tgtactactc ggacagtttg gcaatgcaca ttgatcggc 1020
tctctgttg ggattgttct ggcagcagtg tggatggctt gcgcacgact ttctcacca 1080
ccaagtcttt aagcaacgaa agtacggaga tctcgttggc atcttttggg gagatctcat 1140
gcagggggtc tcgatgcagt ggtggaagaa caagcacaat ggccaccatg ctgttcccaa 1200
cttgcaaac tcttcttgg acagtcagga tggatgccc gatattgata ccatgccact 1260
ccttgcttgg agtctcaagc aggtcagag tticagagag atcaataagg gaaaggacag 1320
taccttcgtc aagtacgcta tcaaatcca ggcattcaca tacttcccca tctctctt 1380
ggctcgcac tcttggttga atgaatcctt caaaactgca ttcggactcg gagtgctc 1440

ggagaatgcc aagttggagt tggagaagcg tggacttcag tacccacttt tggagaagct 1500
tggaatcacc cttcattaca ctggtatgtt cgtcctctct tccggatttg gaaggtggtc 1560
tcttccatat tccatcatgt atttcttcac tgccacatgc tctcggggac ttttctcgc 1620
attggtcttt ggattgggac acaacggtat gtcagtgtac gatgccacca cccgacctga 1680
cttctggcaa ctccaagtca ccactacacg taacatcatt ggtggacacg gcattcccca 1740
attctttgtg gattggttct gcggtggatt gcaataccaa gtggatcacc acctcttccc 1800
catgatgcct agaaacaata tcgcgaaatg ccacaagctt gtggagtcac tctgtaagga 1860
gtgggggtgt aagtaccatg aggccgatat gtgggatggt accgtggaag tgttgcaaca 1920
tctctccaag gtgtcggatg atttctctgt ggagatggtg aaggatttcc ctgccatgta 1980
aacacctatt accagtgggc agctttgtcg gttgctggag atgaatgatg cgaactcatc 2040
gtaaatactc attattaatg aacaatgta ccctgcagtc gtgaggttg ccttcgttgt 2100
cccacccctt ctattgtgta ttggtgatca ttgaaacgag atagtctatt tctacatcag 2160
atctctccat tcacctcga atagtatccc aacaaccatc acatcaaact actgaatct 2220
cctctgtggc aatccctccc attgtacatt tactctcaaa ggtatatcta tttgtccctt 2280
tattaattgt tgaatattga aggggaagat tccattttcc cctctctctt ccccgatgat 2340
cctctcacct ctaaatacct ttcacaacac aacaacgaaa caacgcagat cagacaaaca 2400
acatggcaga actatctca ccgtgcaaac gatccaaagg cgaagagcta ttctagtcc 2460
atctccaacg catgtctggc tccagaccct catcctgaag agtgagttgt gatgtcgtg 2520
atgtactttc cgtcttgatg ttctctgagg tgtcacaact cagggtcacc aaagcagctt 2580
cgctgatcgc tagtggcgag aagatccgat ttccatccc gaagaaagcc tctggggaaa 2640
aatgtcactt ctgaaagtc gagggtgacg aataattggg ggcggangn 2689

<210> 10
<211> 1458
<212> PRT
<213> Thalassiosira pseudonana

<400> 10

Ala Thr Gly Gly Cys Thr Gly Gly Ala Ala Ala Ala Gly Gly Ala Gly
1 5 10 15

Gly Ala Gly Ala Cys Gly Cys Ala Gly Cys Cys Gly Cys Ala Gly Cys
20 25 30

Thr Ala Cys Cys Ala Ala Gly Cys Gly Thr Ala Gly Thr Gly Gly Ala
35 40 45

Gly Cys Ala Thr Thr Gly Ala Ala Ala Thr Thr Gly Gly Cys Gly Gly
50 55 60

Ala Gly Ala Ala Gly Cys Cys Gly Cys Ala Gly Ala Ala Gly Thr Ala
65 70 75 80

Cys Ala Cys Thr Thr Gly Gly Cys Ala Gly Gly Ala Gly Gly Thr Gly
85 90 95

Ala Ala Gly Ala Ala Gly Cys Ala Cys Ala Thr Cys Ala Cys Cys Cys
100 105 110

Cys Cys Gly Ala Cys Gly Ala Thr Gly Cys Cys Thr Gly Gly Gly Thr
115 120 125

Ala Gly Thr Cys Cys Ala Cys Cys Ala Ala Ala Cys Ala Ala Ala
130 135 140

Gly Thr Cys Thr Ala Cys Gly Ala Cys Gly Thr Cys Thr Cys Cys Ala
145 150 155 160

Ala Cys Thr Gly Gly Thr Ala Cys Gly Ala Cys Cys Ala Cys Cys Cys
165 170 175

Cys Gly Gly Thr Gly Gly Ala Gly Cys Cys Gly Thr Gly Gly Thr Gly
180 185 190

Thr Thr Cys Ala Cys Cys Cys Ala Cys Gly Cys Cys Gly Gly Ala Gly
195 200 205

Ala Cys Gly Ala Cys Ala Thr Gly Ala Cys Gly Gly Ala Cys Ala Thr
210 215 220

Cys Thr Thr Cys Gly Cys Cys Gly Cys Cys Thr Thr Cys Cys Ala Cys
225 230 235 240

Gly Cys Cys Cys Ala Ala Gly Gly Cys Thr Cys Thr Cys Ala Gly Gly
245 250 255

Cys Cys Ala Thr Gly Ala Thr Gly Ala Ala Gly Ala Ala Gly Thr Thr
260 265 270

Thr Thr Ala Cys Ala Thr Thr Gly Gly Ala Gly Ala Thr Thr Thr Gly
275 280 285

Ala Thr Thr Cys Cys Gly Gly Ala Gly Ala Gly Thr Gly Thr Gly Gly
290 295 300

Ala Gly Cys Ala Thr Ala Ala Gly Gly Ala Thr Cys Ala Ala Ala Gly
305 310 315 320

Ala Cys Ala Gly Thr Thr Gly Gly Ala Thr Thr Thr Cys Gly Ala Gly
325 330 335

Ala Ala Gly Gly Gly Ala Thr Ala Thr Cys Gly Thr Gly Ala Thr Thr
340 345 350

Thr Ala Cys Gly Gly Gly Cys Cys Ala Ala Gly Cys Thr Thr Gly Thr
355 360 365

Cys Ala Thr Gly Ala Thr Gly Gly Gly Ala Thr Gly Thr Thr Cys
370 375 380

Ala Ala Gly Thr Cys Gly Ala Gly Thr Ala Ala Gly Ala Thr Gly Thr
385 390 395 400

Ala Thr Thr Ala Thr Gly Cys Ala Thr Ala Cys Ala Ala Gly Thr Gly
405 410 415

Cys Thr Cys Gly Thr Thr Cys Ala Ala Thr Ala Thr Gly Thr Gly Cys
420 425 430

Ala Thr Gly Thr Gly Gly Thr Thr Gly Gly Thr Gly Gly Cys Gly Gly
435 440 445

Thr Gly Gly Cys Cys Ala Thr Gly Gly Thr Gly Thr Ala Cys Thr Ala
450 455 460

Cys Thr Cys Gly Gly Ala Cys Ala Gly Thr Thr Thr Gly Gly Cys Ala
465 470 475 480

Ala Thr Gly Cys Ala Cys Ala Thr Thr Gly Gly Ala Thr Cys Gly Gly
485 490 495

Cys Thr Cys Thr Cys Thr Thr Gly Thr Thr Gly Gly Gly Ala Thr Thr
500 505 510

Gly Thr Thr Cys Thr Gly Gly Cys Ala Gly Cys Ala Gly Thr Gly Thr
515 520 525

Gly Gly Ala Thr Gly Gly Cys Thr Thr Gly Cys Gly Cys Ala Cys Gly
530 535 540

Ala Cys Thr Thr Thr Cys Thr Thr Cys Ala Cys Cys Ala Cys Cys Ala
545 550 555 560

Ala Gly Thr Cys Thr Thr Thr Ala Ala Gly Cys Ala Ala Cys Gly Ala
565 570 575

Ala Ala Gly Thr Ala Cys Gly Gly Ala Gly Ala Thr Cys Thr Cys Gly
580 585 590

Thr Thr Gly Gly Cys Ala Thr Cys Thr Thr Thr Thr Gly Gly Gly Gly
595 600 605

Ala Gly Ala Thr Cys Thr Cys Ala Thr Gly Cys Ala Gly Gly Gly Gly
610 615 620

Thr Thr Cys Thr Cys Gly Ala Thr Gly Cys Ala Gly Thr Gly Gly Thr
625 630 635 640

Gly Gly Ala Ala Gly Ala Ala Cys Ala Ala Gly Cys Ala Cys Ala Ala
645 650 655

Thr Gly Gly Cys Cys Ala Cys Cys Ala Thr Gly Cys Thr Gly Thr Thr
660 665 670

Cys Cys Cys Ala Ala Cys Thr Thr Gly Cys Ala Cys Ala Ala Cys Thr
675 680 685

Cys Thr Thr Cys Cys Thr Thr Gly Gly Ala Cys Ala Gly Thr Cys Ala
690 695 700

Gly Gly Ala Thr Gly Gly Thr Gly Ala Thr Cys Cys Cys Gly Ala Thr
705 710 715 720

Ala Thr Thr Gly Ala Thr Ala Cys Cys Ala Thr Gly Cys Cys Ala Cys
725 730 735

Thr Cys Cys Thr Thr Gly Cys Thr Thr Gly Gly Ala Gly Thr Cys Thr
740 745 750

Cys Ala Ala Gly Cys Ala Gly Gly Cys Thr Cys Ala Gly Ala Gly Thr
755 760 765

Thr Thr Cys Ala Gly Ala Gly Ala Gly Ala Thr Cys Ala Ala Thr Ala
770 775 780

Ala Gly Gly Gly Ala Ala Ala Gly Gly Ala Cys Ala Gly Thr Ala Cys
785 790 795 800

Cys Thr Thr Cys Gly Thr Cys Ala Ala Gly Thr Ala Cys Gly Cys Thr
805 810 815

Ala Thr Cys Ala Ala Ala Thr Thr Cys Cys Ala Gly Gly Cys Ala Thr
820 825 830

Thr Cys Ala Cys Ala Thr Ala Cys Thr Thr Cys Cys Cys Cys Ala Thr
835 840 845

Cys Cys Thr Cys Cys Thr Cys Thr Thr Gly Gly Cys Thr Cys Gly Cys
850 855 860

Ala Thr Cys Thr Cys Thr Thr Gly Gly Thr Thr Gly Ala Ala Thr Gly
865 870 875 880

Ala Ala Thr Cys Cys Thr Thr Cys Ala Ala Ala Ala Cys Thr Gly Cys
885 890 895

Ala Thr Thr Cys Gly Gly Ala Cys Thr Cys Gly Gly Ala Gly Cys Thr
900 905 910

Gly Cys Cys Thr Cys Gly Gly Ala Gly Ala Ala Thr Gly Cys Cys Ala
915 920 925

Ala Gly Thr Thr Gly Gly Ala Gly Thr Thr Gly Gly Ala Gly Ala Ala
930 935 940

Gly Cys Gly Thr Gly Gly Ala Cys Thr Thr Cys Ala Gly Thr Ala Cys
945 950 955 960

Cys Cys Ala Cys Thr Thr Thr Thr Gly Gly Ala Gly Ala Ala Gly Cys
965 970 975

Thr Thr Gly Gly Ala Ala Thr Cys Ala Cys Cys Cys Thr Thr Cys Ala
980 985 990

Cys Thr Ala Cys Ala Cys Thr Thr Gly Gly Ala Thr Gly Thr Thr Cys
995 1000 1005

Gly Thr Cys Cys Thr Cys Thr Cys Thr Thr Cys Cys Gly Gly Ala
1010 1015 1020

Thr Thr Thr Gly Gly Ala Ala Gly Gly Thr Gly Gly Thr Cys Thr
1025 1030 1035

Cys Thr Thr Cys Cys Ala Thr Ala Thr Thr Cys Cys Ala Thr Cys
1040 1045 1050

Ala Thr Gly Thr Ala Thr Thr Thr Cys Thr Thr Cys Ala Cys Thr
1055 1060 1065

Gly Cys Cys Ala Cys Ala Thr Gly Cys Thr Cys Cys Thr Cys Gly
1070 1075 1080

Gly Gly Ala Cys Thr Thr Thr Thr Cys Cys Thr Cys Gly Cys Ala
1085 1090 1095

Thr Thr Gly Gly Thr Cys Thr Thr Thr Gly Gly Ala Thr Thr Gly
1100 1105 1110

Gly Gly Ala Cys Ala Cys Ala Ala Cys Gly Gly Thr Ala Thr Gly
1115 1120 1125

Thr Cys Ala Gly Thr Gly Thr Ala Cys Gly Ala Thr Gly Cys Cys
1130 1135 1140

Ala Cys Cys Ala Cys Cys Cys Gly Ala Cys Cys Thr Gly Ala Cys
1145 1150 1155

Thr Thr Cys Thr Gly Gly Cys Ala Ala Cys Thr Cys Cys Ala Ala
1160 1165 1170

Gly Thr Cys Ala Cys Cys Ala Cys Thr Ala Cys Ala Cys Gly Thr
1175 1180 1185

Ala Ala Cys Ala Thr Cys Ala Thr Thr Gly Gly Thr Gly Gly Ala
1190 1195 1200

Cys Ala Cys Gly Gly Cys Ala Thr Thr Cys Cys Cys Cys Ala Ala
1205 1210 1215

Thr Thr Cys Thr Thr Thr Gly Thr Gly Gly Ala Thr Thr Gly Gly
1220 1225 1230

Thr Thr Cys Thr Gly Cys Gly Gly Thr Gly Gly Ala Thr Thr Gly
1235 1240 1245

Cys Ala Ala Thr Ala Cys Cys Ala Ala Gly Thr Gly Gly Ala Thr
1250 1255 1260

Cys Ala Cys Cys Ala Cys Cys Thr Cys Thr Thr Cys Cys Cys Cys
1265 1270 1275

Ala Thr Gly Ala Thr Gly Cys Cys Thr Ala Gly Ala Ala Ala Cys
1280 1285 1290

Ala Ala Thr Ala Thr Cys Gly Cys Gly Ala Ala Gly Thr Gly Cys
1295 1300 1305

Cys Ala Cys Ala Ala Gly Cys Thr Thr Gly Thr Gly Gly Ala Gly
1310 1315 1320

Thr Cys Ala Thr Thr Cys Thr Gly Thr Ala Ala Gly Gly Ala Gly
1325 1330 1335

Thr Gly Gly Gly Gly Thr Gly Thr Gly Ala Ala Gly Thr Ala Cys
1340 1345 1350

Cys Ala Thr Gly Ala Gly Gly Cys Thr Gly Ala Thr Ala Thr Gly
1355 1360 1365

Thr Gly Gly Gly Ala Thr Gly Gly Thr Ala Cys Cys Gly Thr Gly
1370 1375 1380

Gly Ala Ala Gly Thr Gly Thr Thr Gly Cys Ala Ala Cys Ala Thr
1385 1390 1395

Cys Thr Cys Thr Cys Cys Ala Ala Gly Gly Thr Gly Thr Cys Gly
1400 1405 1410

Gly Ala Thr Gly Ala Thr Thr Thr Cys Cys Thr Thr Gly Thr Gly
1415 1420 1425

Gly Ala Gly Ala Thr Gly Gly Thr Gly Ala Ala Gly Gly Ala Thr
1430 1435 1440

Thr Thr Cys Cys Cys Thr Gly Cys Cys Ala Thr Gly Thr Ala Ala
1445 1450 1455

<210> 11
<211> 485
<212> PRT
<213> *Thalassiosira pseudonana*

<400> 11

Met Ala Gly Lys Gly Gly Asp Ala Ala Ala Ala Thr Lys Arg Ser Gly
1 5 10 15

Ala Leu Lys Leu Ala Glu Lys Pro Gln Lys Tyr Thr Trp Gln Glu Val
20 25 30

Lys Lys His Ile Thr Pro Asp Asp Ala Trp Val Val His Gln Asn Lys
35 40 45

Val Tyr Asp Val Ser Asn Trp Tyr Asp His Pro Gly Gly Ala Val Val
50 55 60

Phe Thr His Ala Gly Asp Asp Met Thr Asp Ile Phe Ala Ala Phe His
65 70 75 80

Ala Gln Gly Ser Gln Ala Met Met Lys Lys Phe Tyr Ile Gly Asp Leu
85 90 95

Ile Pro Glu Ser Val Glu His Lys Asp Gln Arg Gln Leu Asp Phe Glu
100 105 110

Lys Gly Tyr Arg Asp Leu Arg Ala Lys Leu Val Met Met Gly Met Phe
115 120 125

Lys Ser Ser Lys Met Tyr Tyr Ala Tyr Lys Cys Ser Phe Asn Met Cys
130 135 140

Met Trp Leu Val Ala Val Ala Met Val Tyr Tyr Ser Asp Ser Leu Ala
145 150 155 160

Met His Ile Gly Ser Ala Leu Leu Leu Gly Leu Phe Trp Gln Gln Cys
165 170 175

Gly Trp Leu Ala His Asp Phe Leu His His Gln Val Phe Lys Gln Arg
180 185 190

Lys Tyr Gly Asp Leu Val Gly Ile Phe Trp Gly Asp Leu Met Gln Gly
195 200 205

Phe Ser Met Gln Trp Trp Lys Asn Lys His Asn Gly His His Ala Val
210 215 220

Pro Asn Leu His Asn Ser Ser Leu Asp Ser Gln Asp Gly Asp Pro Asp
225 230 235 240

Ile Asp Thr Met Pro Leu Leu Ala Trp Ser Leu Lys Gln Ala Gln Ser
Page 20

245 250 255

Phe Arg Glu Ile Asn Lys Gly Lys Asp Ser Thr Phe Val Lys Tyr Ala
260 265 270

Ile Lys Phe Gln Ala Phe Thr Tyr Phe Pro Ile Leu Leu Leu Ala Arg
275 280 285

Ile Ser Trp Leu Asn Glu Ser Phe Lys Thr Ala Phe Gly Leu Gly Ala
290 295 300

Ala Ser Glu Asn Ala Lys Leu Glu Leu Glu Lys Arg Gly Leu Gln Tyr
305 310 315 320

Pro Leu Leu Glu Lys Leu Gly Ile Thr Leu His Tyr Thr Trp Met Phe
325 330 335

Val Leu Ser Ser Gly Phe Gly Arg Trp Ser Leu Pro Tyr Ser Ile Met
340 345 350

Tyr Phe Phe Thr Ala Thr Cys Ser Ser Gly Leu Phe Leu Ala Leu Val
355 360 365

Phe Gly Leu Gly His Asn Gly Met Ser Val Tyr Asp Ala Thr Thr Arg
370 375 380

Pro Asp Phe Trp Gln Leu Gln Val Thr Thr Thr Arg Asn Ile Ile Gly
385 390 395 400

Gly His Gly Ile Pro Gln Phe Phe Val Asp Trp Phe Cys Gly Gly Leu
405 410 415

Gln Tyr Gln Val Asp His His Leu Phe Pro Met Met Pro Arg Asn Asn
420 425 430

Ile Ala Lys Cys His Lys Leu Val Glu Ser Phe Cys Lys Glu Trp Gly
435 440 445

Val Lys Tyr His Glu Ala Asp Met Trp Asp Gly Thr Val Glu Val Leu
450 455 460

Gln His Leu Ser Lys Val Ser Asp Asp Phe Leu Val Glu Met Val Lys
465 470 475 480

Asp Phe Pro Ala Met
485

<210> 12
<211> 2775
<212> DNA
<213> Thalassiosira pseudonana

<220>

<221> misc_feature
<222> (2530)..(2530)
<223> n is a, c, g, or t

<220>
<221> misc_feature
<222> (2743)..(2743)
<223> n is a, c, g, or t

<400> 12
tatgtccacc cccccctggt ttgtccacct ctgtcttcga tottgggacc cgggtctcga 60
gtttgcgaga cctctcaagc gggcccatag tagacgactt gatctgtttg ctgatacctg 120
acgtgcaccg atttttcggg gctaacgcc ctttcgtaa ctccaccagg tacgactgac 180
ttgtgccgt agatatctt gatacctcta tggcaaagcc gatcaaactg aaatgattgt 240
actgtagcaa ggataagcag atggataggc gggggatctt catgtcgaca agaggaagag 300
agagagtatg tcgtcggcga ggggtgatag gttgagagag aggggatgac agattgtaca 360
ttatcttccc tccaagactt taccaaggca cgtcactctg attagaatct tacatacacg 420
tggagtaata gtggacaata aatgacaagt gaagcaccoc agtggacat ttcgtcgcca 480
cgtggctgct cgctgtgggt tgagtgaacc gacgacgacg aacacaaccg ctgaatctcc 540
ttcggcaaca acaatacacc aatatgtgca acggcaacct ccagcatcc accgcacagc 600
tcaagtccac ctgaagccc cagcagcaac atgagcatcg caccatctcc aagtcgagc 660
tcgccaaca caacacgccc aaatcagcat ggtgtgccgt ccactccact cccgccaccg 720
acccatccca ctccaacaac aaacaacacg cacacctagt cctcgacatt accgactttg 780
cgtcccgcca tccaggggga gacctcatcc tctcgtctc cggcaaagac gcctcggctc 840
tgtttgaac ataccatcca cgtggagttc cgacgtctct cattcaaaag ctgcagattg 900
gagtgatgga ggaggaggcg ttctgggatt cgttttacag ttggactgat tctgactttt 960
atactgtgtt gaagaggagg gttgtggagc ggttgaggga gaggggggtg gcgaggaggg 1020
gatcgaaaga gatttgatc aaggctttgt tctgttgggt tggattttgg tactgtttgt 1080
acaagatgta tactacgtcg gatattgatc agtacggtat tgccattgcc tattctattg 1140
gaatgggaac ctttcggca ttcacggca cgtgtattca acacgatgga aatcacggtg 1200
cattcgctca gaacaagtta ctcaacaagt tggctgggtg gacgttggat atgattggtg 1260
cgagtgcgtt tacgtgggag cttcagcaca tgctggggca tcatccatat acgaatgtgt 1320
tggatggggt ggaggaggag aggaaggaga ggggggagga tgttgccttg gaagaaaagg 1380
atcaggtgag acgagatgac agagagagag agagtctatt cgtgtgaagt cgtagatgca 1440
tgtgtcgat tgagcgacac aactctaacg cattgcattc cactttcaac tcgccgacag 1500
gaatcagatc cagacgtatt ctctccttc cctctcatga gaatgcatcc cctccataca 1560
acctcatggt atcataaata ccaacacctc tacgctccac cctctttgc attgatgaca 1620
cttgccaaag tattccaaca ggattttgaa gttgccacat ccggacgatt atatcatatt 1680
gatgccaatg tacgttatgg ttccgtatgg aatgcatga ggtttgggc tatgaaggtc 1740
attacgatgg gatatatgat gggattacca atctacttc atggagtact gaggggagtt 1800

ggattgttg ttattgggca ttggcgtgt ggagagttgt tggcgacgat gtttattgtg 1860
aatcacgtca ttgaggtgt gagttatgga acgaaggatt tggttggtgg tgcgagtcac 1920
gtagatgaga agaagattgt caagccaacg actgtattgg gagatacacc aatggaaaag 1980
actcgcgagg aggcatgaa aagcaacagc aataacaaca agaagaaggg agagaagaac 2040
tcggtacat cgttccatt caacgactgg gcagcagtc aatgccagac ctccgtgaat 2100
tggtctccag gctcatggt ctggaatcac tttctgggg gactctctca tcagattgag 2160
catcactgt tccccagcat ttgtcataca aactactgtc atatccagga tgttgaggag 2220
agtacgtgtg ctgagtacgg agttccgtat cagagtgaga gtaatttgt tttgtctat 2280
ggaaagatga ttagtcattt gaagttttg ggtaaagcca agtgtgagta ggtgttaggt 2340
attgagaggt gtcgagttgt ctactcttt aaaaataagc gctgaaagtg attcgaaaa 2400
acaaggtttg tcaataccag tctctgtat tgattgctgc gtcgacacat ctccgtgagg 2460
agtttgacct cactcattct aacttggaat gtctctttg cgctgggtgag cttggacgaa 2520
tacactccgn cagaagagac tgcatggta atgcagagga aagaggatat actgtatgag 2580
tccgaagaat cgatgacgcg cggtgagggtg gtgtacatca cttgtgagga ccaacgtgga 2640
accgcatgtc tgaagaggtc catacctaaa catttgagcg gtctggggag caaacttag 2700
cagagattga atgctccatt cggatattgt tctctgtgc canttgata aggaacagca 2760
accaacacac cgggg 2775

<210> 13
<211> 564
<212> PRT
<213> *Thalassiosira pseudonana*

<400> 13

Met Cys Asn Gly Asn Leu Pro Ala Ser Thr Ala Gln Leu Lys Ser Thr
1 5 10 15

Ser Lys Pro Gln Gln Gln His Glu His Arg Thr Ile Ser Lys Ser Glu
20 25 30

Leu Ala Gln His Asn Thr Pro Lys Ser Ala Trp Cys Ala Val His Ser
35 40 45

Thr Pro Ala Thr Asp Pro Ser His Ser Asn Asn Lys Gln His Ala His
50 55 60

Leu Val Leu Asp Ile Thr Asp Phe Ala Ser Arg His Pro Gly Gly Asp
65 70 75 80

Leu Ile Leu Leu Ala Ser Gly Lys Asp Ala Ser Val Leu Phe Glu Thr
85 90 95

Tyr His Pro Arg Gly Val Pro Thr Ser Leu Ile Gln Lys Leu Gln Ile
100 105 110

Gly Val Met Glu Glu Glu Ala Phe Arg Asp Ser Phe Tyr Ser Trp Thr
115 120 125

Asp Ser Asp Phe Tyr Thr Val Leu Lys Arg Arg Val Val Glu Arg Leu
130 135 140

Glu Glu Arg Gly Leu Ala Arg Arg Gly Ser Lys Glu Ile Trp Ile Lys
145 150 155 160

Ala Leu Phe Leu Leu Val Gly Phe Trp Tyr Cys Leu Tyr Lys Met Tyr
165 170 175

Thr Thr Ser Asp Ile Asp Gln Tyr Gly Ile Ala Ile Ala Tyr Ser Ile
180 185 190

Gly Met Gly Thr Phe Ala Ala Phe Ile Gly Thr Cys Ile Gln His Asp
195 200 205

Gly Asn His Gly Ala Phe Ala Gln Asn Lys Leu Leu Asn Lys Leu Ala
210 215 220

Gly Trp Thr Leu Asp Met Ile Gly Ala Ser Ala Phe Thr Trp Glu Leu
225 230 235 240

Gln His Met Leu Gly His His Pro Tyr Thr Asn Val Leu Asp Gly Val
245 250 255

Glu Glu Glu Arg Lys Glu Arg Gly Glu Asp Val Ala Leu Glu Glu Lys
260 265 270

Asp Gln Val Arg Arg Asp Asp Arg Glu Arg Glu Ser Leu Phe Val Gln
275 280 285

Glu Ser Asp Pro Asp Val Phe Ser Ser Phe Pro Leu Met Arg Met His
290 295 300

Pro Leu His Thr Thr Ser Trp Tyr His Lys Tyr Gln His Leu Tyr Ala
305 310 315 320

Pro Pro Leu Phe Ala Leu Met Thr Leu Ala Lys Val Phe Gln Gln Asp
325 330 335

Phe Glu Val Ala Thr Ser Gly Arg Leu Tyr His Ile Asp Ala Asn Val
340 345 350

Arg Tyr Gly Ser Val Trp Asn Val Met Arg Phe Trp Ala Met Lys Val
355 360 365

Ile Thr Met Gly Tyr Met Met Gly Leu Pro Ile Tyr Phe His Gly Val
370 375 380

Leu Arg Gly Val Gly Leu Phe Val Ile Gly His Leu Ala Cys Gly Glu
385 390 395 400

Leu Leu Ala Thr Met Phe Ile Val Asn His Val Ile Glu Gly Val Ser
405 410 415

Tyr Gly Thr Lys Asp Leu Val Gly Gly Ala Ser His Val Asp Glu Lys
420 425 430

Lys Ile Val Lys Pro Thr Thr Val Leu Gly Asp Thr Pro Met Glu Lys
435 440 445

Thr Arg Glu Glu Ala Leu Lys Ser Asn Ser Asn Asn Asn Lys Lys Lys
450 455 460

Gly Glu Lys Asn Ser Val Pro Ser Val Pro Phe Asn Asp Trp Ala Ala
465 470 475 480

Val Gln Cys Gln Thr Ser Val Asn Trp Ser Pro Gly Ser Trp Phe Trp
485 490 495

Asn His Phe Ser Gly Gly Leu Ser His Gln Ile Glu His His Leu Phe
500 505 510

Pro Ser Ile Cys His Thr Asn Tyr Cys His Ile Gln Asp Val Val Glu
515 520 525

Ser Thr Cys Ala Glu Tyr Gly Val Pro Tyr Gln Ser Glu Ser Asn Leu
530 535 540

Phe Val Ala Tyr Gly Lys Met Ile Ser His Leu Lys Phe Leu Gly Lys
545 550 555 560

Ala Lys Cys Glu

<210> 14

<211> 1434

<212> DNA

<213> *Thalassiosira pseudonana*

<400> 14

atggactttc tctccggcga tcctttccgg acactcgtcc ttgcagcact tgtgtcatc 60

ggatttgctg cggcgtggca atgcttctac ccgccgagca tcgtcggcaa gcctcgtaca 120

ttaagcaatg gtaaactcaa taccagaatc catggcaaat tgtacgacct ctcacgttt 180

cagcatccag gaggccccgt ggctctttct ctgttcaag gtcgcgacgg aacagctcta 240

tttgagtcac accatccctt catacctcga aagaatctac ttcagatcct ctccaagtac 300

gaggttccgt cgactgaaga ctctgtttcc ttcacgcga ccctagacga actcaatgg 360

gaatctccgt acgattggaa ggacattgaa aatgatgatt tcgtatctga cctacgagct 420

ctcgtaatg agcactttc tcctctcgcc aaggaaaggg gagtttact cgttgagtcg 480

tcgaaggcaa cacctcagcg gtggatggtg gttctactgc tccttcgctc gttcttcctc 540

agcatcccat tataattgag tgggtcgtg actttcgttg tcgtcactcc catcctcgct 600
 tggctggcgg ttgtcaatta ctggcacgat gctactact ttgcattgag cagcaactgg 660
 attttgaatg ctgcgctccc atatctctc cctctcctat cgagtccgctc aatgtggtat 720
 catcatcacg tcattggaca tcacgcatac accaacaattt ccaaaagaga tccagatctt 780
 gctcacgctc cacaactcat gagagaacac aagagtatca aatggagacc atctcactta 840
 aatcaaacac agcttccgcg gattctcttc atctggtcga ttgcagtcgg tattggggtg 900
 aacttactga acgacgtgag agcactaacc aagctttcat acaacaacgt tgttcgggtg 960
 gagaagatgt catcgtcgcg aacattactc catttccttg gacgtatgtt gcacatcttt 1020
 gtgactacac ttgggccctt ttgggcgttt ccggtgtgga aggccatcgt ttgggcgact 1080
 gtaccgaatg ccatactgag ttgtgcttc atgctgaata cgcaaatcaa tcacctcatc 1140
 aacacgtgtg cacatgcttc cgataacaac ttttacaagc atcaagttgt aactgctcag 1200
 aactttggcc gatcaagtgc cttttgcttc atcttctcgg gaggtctcaa ctaccaaatt 1260
 gaacatcatt tgttgccgac ggtgaacct tgccatttgc cagctttggc cccgggtgta 1320
 gagcgtttgt gtaagaaaca cggggtgaca tacaactctg ttgaaggata cagagaggcc 1380
 atcattgcac actttgcaca taccaaagat atgtcgacga agcctactga ttga 1434

<210> 15
 <211> 2906
 <212> DNA
 <213> *Thalassiosira pseudonana*

<220>
 <221> misc_feature
 <222> (2)..(3)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (14)..(14)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (2645)..(2645)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (2650)..(2650)
 <223> n is a, c, g, or t

<220>
 <221> misc_feature
 <222> (2655)..(2655)
 <223> n is a, c, g, or t

<400> 15
 anntctccca ccngccagc tcttcaggt cgaccggaga tacacacttc ttcccaccaa 60
 cttcgtcctc catacgatcg gaagaaaaga ggagattatc ttgacttctt gacggaggag 120
 tgggatgaaa agaacttgag tgggtaaggg ctgattttcc tgagaaggag aagtcagctg 180
 gaacgaagtt catggagttt tgtggcaacc ctattgagac gttgcttggg ggaggaaggt 240

agcgagggttg agcatgcaaa cagaatggta taaatcacta agatgtcact cccaatgaca 300
 agtaggaata gcaatgacga gatgggttac agatgttaga gatggagaga ttaagcgaat 360
 ggctggatga ttaggatatg caatgcaaaa ctgtatagat tcttgctaag agactttgta 420
 gacaacgtcc gtctgcagaa aaggacaata ctaattaata taaaaccgac tcggagagaa 480
 catgacatgg caagttgtca ctatggaatt cactacgtcg cttgacagga agctcacgtg 540
 gcctcggcga agaagacaaa caaaaccgag ccctcacatt tcactctgta cagttcatag 600
 tcaacaccac caatacgtg ccccccaacg ccgatatctc ccgcatccgc aaccgcatcc 660
 ccacaaaaac aggtaccgtt gcctctgccg acaacaacga ccccgccacc caatccgtcc 720
 gaaccctcaa atctctcaag ggcaacgagg tcgtcatcaa cggcacaatt tatgacattg 780
 ctgactttgt ccatcctgga ggagagggtg tcaagttctt tggtggaat gatgttacta 840
 ttcagtataa tatgattcat ccgtatcata cggggaaaca tctggagaag atgaaggctg 900
 ttggaaaggt ttagattgg cagtcggagt gagtttgaat ggtgcacacg ttgacgttgt 960
 tgttgttca tttcgttctt tgcatttgat atccaactga cctctacaca cctctcgtt 1020
 accatagcta caagttcgac acccccttg aacgagagat caaatcagaa gtgttcaaga 1080
 tcgtacgtcg cgggcgtgag ttcggcacia caggctactt cctccgtgcc ttttctaca 1140
 tcgtctctt cttcaccatg caatacatt tcgccatg caccacctc accacctacg 1200
 atcactggta tcagagtggg gtattcatcg caattgtgtt tggatttca caggcattca 1260
 ttgggttgaa tgtccagcac gatgccaatc acggagctgc cagtaagcgt ccctgggtga 1320
 atgacttgtt gggatttga acggatttga ttgatctaa caaatggaat tggatggcac 1380
 agcattggac tcacacgct tacactaacc atagttagaa ggatcccgat agcttcagct 1440
 cggaacctat gttgcattc aatgactatc ccattggaca cccgaagaga aagtgggtgc 1500
 ataggtcca gggagggtac ttctcttca tgcttgact ttactggctc tcgactgtat 1560
 tcaatccga attcattgat ctctgtaac gtggggctca gtacgtcgga attcaaatgg 1620
 agaatgattt cattgtcaag aggaggaagt acgccgtgc attgaggatg atgtacattt 1680
 actgaacat tgcagcccc tcatgaaca atggtttgag ctggtctacc tttggaatca 1740
 tcatgttgat gggaatcagc gagagtctca ctctcagtgt gctctctcg ttgtctaca 1800
 acttcatcaa ttccgatcgt gatcctacgg ctgacttcaa aaagaccgga gaacaagtgt 1860
 gctggttcaa gtgcagggtg gagacttcgt ctacctatgg gggtttatt tccgatgtc 1920
 ttacgggagg actcaactt caggtggaac atcatctctt tccccgatg agcagtgtt 1980
 ggtatcctta cattgcacct acggttcgtg aggtttgcaa gaagcacggg gtgaactacg 2040
 cttattatcc ttggattggg cagaatttg tatcaacatt caaatacatg catcgcgctg 2100
 gtagtggagc caactgggag ctcaagccgt tgcctggaag tgcctaaagt ttagtgtac 2160
 tgattgtcg aggtgctgct ggtgcttcaa ctaatgttag gagtgcattg taaaagcctt 2220
 ctttgtttt tgtgtcttc gtattcagta tatcagttc gatatgttc attgtaacct 2280
 cctccactg cactcaaac aaatctagca taacattct catcccgagt catgtcatga 2340

acgactcatt acgcaatgcc tctctcataa ccccgaaaca actcgaccag cttcatactc 2400
 taatcgtcca totttggcag ctgcaatcca gccctagcag cagctctctt actcaactcc 2460
 atcggactca acttcgtatc tgcccccgca tcaatctcat gcaaccgtgc cctctctacc 2520
 aaatctgcct ttaacatcca gtaatcatag gcgattccac gtagtacgtt tgctcgctcg 2580
 ggagacactg atgccgatgc ttgtattgt gatatactgt gctggtcgc gcacgatgc 2640
 tccngtgn gttngactg tgcattggat gctgctgta aacagtcggt gcagtgtagc 2700
 ggaggtgctg ttctgaact gaggagatgc ccgcaaactg ataggggggtg gtgcagcgct 2760
 ataaatttg cgagcgagtc cattgtcctt gctctccca tatgtcgggc gagggcgaag 2820
 cgcaaggag aagccacaag gccaatataa cagaaagtt aaatgaagga cgtaattcct 2880
 acacagtcca gtggcgaagt tacaac 2906

<210> 16
 <211> 1434
 <212> DNA
 <213> *Thalassiosira pseudonana*

<400> 16
 atggctcccc ccaacgccga tatctccgc atccgcaacc gcaccccccac caaacaggt 60
 accgttgct ctgccgaca caacgacccc gccacccaat ccgtccgaac cctcaaatct 120
 ctcaaggga acgaggtcgt catcaacggc acaatttatg acattgctga cttgtccat 180
 cctggaggag aggttgtaa gttcttggg gggaatgatg ttactattca gtataatatg 240
 attcatccgt atcacacggg gaaacatctg gagaagatga aggctgttg aaaggttga 300
 gattggcagt cggactacaa gttcgacacc cccttgaac gagagatcaa atcagaagtg 360
 ttcaagatcg tacgtcgcg gcgtgagttc ggcacaacag gctacttct ccgtgccttt 420
 ttctacatcg ctctctctt caccatgcaa tacactttcg ccacatgcac caccttcacc 480
 acctacgatc actggtatca gagtgggtga ttcatcgcaa ttgtgtttgg tatttcacag 540
 gcattcattg ggttgaatgt ccagcacgat gccaatcacg gagctgccag taagcgtccc 600
 tgggtgaatg acttgttggg atttgaacg gatttgattg gatctaaca atggaattgg 660
 atggcacagc attggactca tcacgcttac actaaccata gtgagaagga tccgatagc 720
 ttcagctcgg aacctatgt tgcatcfaat gactatccca ttggacaccc gaagagaaag 780
 tggtagcata ggttcaggg agggctactc ctctcatgc ttggacttta ctggctccc 840
 actgtattca atccgcaatt cattgatctt cgtaacgtg gggctcagta cgtcggaatt 900
 caaatggaga atgatttcat tgtcaagagg aggaagtacg ccgttcatt gaggatgatg 960
 tacatttact tgaacattg cagcccctc atgaacaatg gttgagctg gtctaccttt 1020
 ggaatcatca tgttgatggg aatcagcgag agtctcactc tcagtgtgct ctctcgttg 1080
 tctcacaact tcatcaattc ggaatcgtat cctacggctg acttcaaaaa gaccggagaa 1140
 caagtgtgct ggttcaagtc gcaggtggag acttcgtcta cctatggggg ttatttcc 1200
 ggatgtctta cgggaggact caacttcag gtggaacatc atctcttcc ccgatgagc 1260

agtgcttggt atccttacat tgcacctacg gttcgtgagg ttgcaagaa gcacgggatg 1320
 agctacgctt attatccttg gattgggcag aatttggtat caacattcaa atacatgcat 1380
 cgcgctggta gtggagccaa ctgggagctc aagccgttgt ctggaagtgc ctaa 1434

<210> 17
 <211> 477
 <212> PRT
 <213> *Thalassiosira pseudonana*

<400> 17

Met Ala Pro Pro Asn Ala Asp Ile Ser Arg Ile Arg Asn Arg Ile Pro
 1 5 10 15

Thr Lys Thr Gly Thr Val Ala Ser Ala Asp Asn Asn Asp Pro Ala Thr
 20 25 30

Gln Ser Val Arg Thr Leu Lys Ser Leu Lys Gly Asn Glu Val Val Ile
 35 40 45

Asn Gly Thr Ile Tyr Asp Ile Ala Asp Phe Val His Pro Gly Gly Glu
 50 55 60

Val Val Lys Phe Phe Gly Gly Asn Asp Val Thr Ile Gln Tyr Asn Met
 65 70 75 80

Ile His Pro Tyr His Thr Gly Lys His Leu Glu Lys Met Lys Ala Val
 85 90 95

Gly Lys Val Val Asp Trp Gln Ser Asp Tyr Lys Phe Asp Thr Pro Phe
 100 105 110

Glu Arg Glu Ile Lys Ser Glu Val Phe Lys Ile Val Arg Arg Gly Arg
 115 120 125

Glu Phe Gly Thr Thr Gly Tyr Phe Leu Arg Ala Phe Phe Tyr Ile Ala
 130 135 140

Leu Phe Phe Thr Met Gln Tyr Thr Phe Ala Thr Cys Thr Thr Phe Thr
 145 150 155 160

Thr Tyr Asp His Trp Tyr Gln Ser Gly Val Phe Ile Ala Ile Val Phe
 165 170 175

Gly Ile Ser Gln Ala Phe Ile Gly Leu Asn Val Gln His Asp Ala Asn
 180 185 190

His Gly Ala Ala Ser Lys Arg Pro Trp Val Asn Asp Leu Leu Gly Phe
 195 200 205

Gly Thr Asp Leu Ile Gly Ser Asn Lys Trp Asn Trp Met Ala Gln His
 210 215 220

Trp Thr His His Ala Tyr Thr Asn His Ser Glu Lys Asp Pro Asp Ser
225 230 235 240

Phe Ser Ser Glu Pro Met Phe Ala Phe Asn Asp Tyr Pro Ile Gly His
245 250 255

Pro Lys Arg Lys Trp Trp His Arg Phe Gln Gly Gly Tyr Phe Leu Phe
260 265 270

Met Leu Gly Leu Tyr Trp Leu Pro Thr Val Phe Asn Pro Gln Phe Ile
275 280 285

Asp Leu Arg Gln Arg Gly Ala Gln Tyr Val Gly Ile Gln Met Glu Asn
290 295 300

Asp Phe Ile Val Lys Arg Arg Lys Tyr Ala Val Ala Leu Arg Met Met
305 310 315 320

Tyr Ile Tyr Leu Asn Ile Val Ser Pro Phe Met Asn Asn Gly Leu Ser
325 330 335

Trp Ser Thr Phe Gly Ile Ile Met Leu Met Gly Ile Ser Glu Ser Leu
340 345 350

Thr Leu Ser Val Leu Phe Ser Leu Ser His Asn Phe Ile Asn Ser Asp
355 360 365

Arg Asp Pro Thr Ala Asp Phe Lys Lys Thr Gly Glu Gln Val Cys Trp
370 375 380

Phe Lys Ser Gln Val Glu Thr Ser Ser Thr Tyr Gly Gly Phe Ile Ser
385 390 395 400

Gly Cys Leu Thr Gly Gly Leu Asn Phe Gln Val Glu His His Leu Phe
405 410 415

Pro Arg Met Ser Ser Ala Trp Tyr Pro Tyr Ile Ala Pro Thr Val Arg
420 425 430

Glu Val Cys Lys Lys His Gly Met Ser Tyr Ala Tyr Tyr Pro Trp Ile
435 440 445

Gly Gln Asn Leu Val Ser Thr Phe Lys Tyr Met His Arg Ala Gly Ser
450 455 460

Gly Ala Asn Trp Glu Leu Lys Pro Leu Ser Gly Ser Ala
465 470 475

<210> 18

<211> 1428

<212> DNA

<213> *Thalassiosira pseudonana*

<400> 18

atggctcccc ccaacgccga tatctccgc atccgcaacc gcatccccac caaacacagg 60
 acctctgccg acaacaacga ccccgccacc caatccgtcc gaaccctcaa atctctcaag 120
 ggcaacgagg tcgtcatcaa cggcacaatt tatgacattg ctgactttgt ccatcctgga 180
 ggagaggttg tcaagttctt tggtggaat gatgttacta ttcagtataa tatgattcat 240
 ccgtatcata cggggaaaca tctggagaag atgaaggctg ttggaaagggt ttagattgg 300
 cagtcggact acaagttcga caccctt gaacgagaga taaatcaga agtgttcaag 360
 atcgtacgtc gggggcgtga gttcggcaca acaggctact tctccgtgc cttttctac 420
 atcgctctct tcttcccat gcaatacact ttgccacat gcaccacctt caccacctac 480
 gatcactggg atcagagtgg tgtattcatc gcaattgtgt ttggtattc acaggcattc 540
 attgggttga atgtccagca cgtatccaat caggagctg ccagtaagcg tccctgggtg 600
 aatgacttgt tgggatttg aacggatttg attggatcta acaaatggaa ttgatggca 660
 cagcattgga ctcatcacgc ttactaac catagtgaaggatcccg tagcttcagc 720
 tcggaaccta tgttgcatt caatgactat ccattggac acccgaagag aaagtgtgg 780
 cataggttcc agggagggtta ctctcttc atgcttgac ttactggct ctgactgta 840
 ttcaatccgc aattcattga tctctgcaa cgtggggctc agtacgtcg aattcaaatg 900
 gagaatgatt tcattgcaa gaggaggaag tacgccgtg cattgaggat gatgtacatt 960
 tactgaaca ttgtcagccc ctcatgaac aatggttga gctggtctac ctttgaatc 1020
 atcatgttga tgggaatcag cgagagtctc actctcagt tgctctctc gttgtctac 1080
 aacctcatca attcggatcg tgatctacg gctgactca aaaagaccgg agaacaagtg 1140
 tgctggttca agtcgcagggt ggagacttcg tctacctg ggggtttat ttccggatgt 1200
 cttacgggag gactcaact tcagggtgaa catcatctct tccccgtat gagcagtgt 1260
 tggatcctt acattgcacc tacggttcgt gaggttgcagaagcacgg ggtgaactac 1320
 gcttattatc ctggatttg gcagaatttg gtatcaacat taaatacat gcatcgcgct 1380
 ggtagtggag ccaactggga gctcaagccg ttgtctggaa gtgcctaa 1428

<210> 19
 <211> 475
 <212> PRT
 <213> *Thalassiosira pseudonana*

<400> 19

Met Ala Pro Pro Asn Ala Asp Ile Ser Arg Ile Arg Asn Arg Ile Pro
 1 5 10 15

Thr Lys Thr Gly Thr Ser Ala Asp Asn Asn Asp Pro Ala Thr Gln Ser
 20 25 30

Val Arg Thr Leu Lys Ser Leu Lys Gly Asn Glu Val Val Ile Asn Gly
 35 40 45

Thr Ile Tyr Asp Ile Ala Asp Phe Val His Pro Gly Gly Glu Val Val
 50 55 60

Lys Phe Phe Gly Gly Asn Asp Val Thr Ile Gln Tyr Asn Met Ile His
65 70 75 80

Pro Tyr His Thr Gly Lys His Leu Glu Lys Met Lys Ala Val Gly Lys
85 90 95

Val Val Asp Trp Gln Ser Asp Tyr Lys Phe Asp Thr Pro Phe Glu Arg
100 105 110

Glu Ile Lys Ser Glu Val Phe Lys Ile Val Arg Arg Gly Arg Glu Phe
115 120 125

Gly Thr Thr Gly Tyr Phe Leu Arg Ala Phe Phe Tyr Ile Ala Leu Phe
130 135 140

Phe Thr Met Gln Tyr Thr Phe Ala Thr Cys Thr Thr Phe Thr Thr Tyr
145 150 155 160

Asp His Trp Tyr Gln Ser Gly Val Phe Ile Ala Ile Val Phe Gly Ile
165 170 175

Ser Gln Ala Phe Ile Gly Leu Asn Val Gln His Asp Ala Asn His Gly
180 185 190

Ala Ala Ser Lys Arg Pro Trp Val Asn Asp Leu Leu Gly Phe Gly Thr
195 200 205

Asp Leu Ile Gly Ser Asn Lys Trp Asn Trp Met Ala Gln His Trp Thr
210 215 220

His His Ala Tyr Thr Asn His Ser Glu Lys Asp Pro Asp Ser Phe Ser
225 230 235 240

Ser Glu Pro Met Phe Ala Phe Asn Asp Tyr Pro Ile Gly His Pro Lys
245 250 255

Arg Lys Trp Trp His Arg Phe Gln Gly Gly Tyr Phe Leu Phe Met Leu
260 265 270

Gly Leu Tyr Trp Leu Ser Thr Val Phe Asn Pro Gln Phe Ile Asp Leu
275 280 285

Arg Gln Arg Gly Ala Gln Tyr Val Gly Ile Gln Met Glu Asn Asp Phe
290 295 300

Ile Val Lys Arg Arg Lys Tyr Ala Val Ala Leu Arg Met Met Tyr Ile
305 310 315 320

Tyr Leu Asn Ile Val Ser Pro Phe Met Asn Asn Gly Leu Ser Trp Ser
325 330 335

Thr Phe Gly Ile Ile Met Leu Met Gly Ile Ser Glu Ser Leu Thr Leu
340 345 350

Ser Val Leu Phe Ser Leu Ser His Asn Leu Ile Asn Ser Asp Arg Asp
355 360 365

Pro Thr Ala Asp Phe Lys Lys Thr Gly Glu Gln Val Cys Trp Phe Lys
370 375 380

Ser Gln Val Glu Thr Ser Ser Thr Tyr Gly Gly Phe Ile Ser Gly Cys
385 390 395 400

Leu Thr Gly Gly Leu Asn Phe Gln Val Glu His His Leu Phe Pro Arg
405 410 415

Met Ser Ser Ala Trp Tyr Pro Tyr Ile Ala Pro Thr Val Arg Glu Val
420 425 430

Cys Lys Lys His Gly Val Asn Tyr Ala Tyr Tyr Pro Trp Ile Gly Gln
435 440 445

Asn Leu Val Ser Thr Phe Lys Tyr Met His Arg Ala Gly Ser Gly Ala
450 455 460

Asn Trp Glu Leu Lys Pro Leu Ser Gly Ser Ala
465 470 475

<210> 20

<211> 1485

<212> DNA

<213> *Thalassiosira pseudonana*

<400> 20

atggctccac cctccatcaa agacacactc gacgagccct tcgtctcgcc cgcattccacc 60

aagtgcgcca ccaccaaacc cctctcccc cgccgcaaac ccctcaaacg atactcccc 120

tcccaaattc cccaacacaa cactcccacc gatgcatggc tcatttaca atcccaagtc 180

cttgacattt ccaaattgat atcgacccat ccaggtggag agcagacgct gttgaggttt 240

gccggtatgg atgctaccga tgaattgagg gcatttcatg atgattgggt ttggaggag 300

aagttgcctc attttgtgat tggggagggt gattggacta ctaccggcgg ggcagagaat 360

actgtcacga aggatggaca ggttcggag cttatcaagg attcagaga gttgggtgaa 420

cacttcgaca ggttggggta cttcacgtc agtccatggt attacgtccg taagggtgct 480

accgtcttcg ccatttttg atgtgcactc ggactcctc tcaataccga ttccatcca 540

gcacacatgc tcgcggcggg actcctcggg atattctggc aacaatttgc attcgtcgga 600

catgactgtg gtcacatgtc ggcgcggact catgccgtg atcatatga tgtacctaa 660

ctgggagcac tggtgacctt ctcaatggg atttcgtag cgtggtggaa ggctacgcac 720

aatgttcac atgctgtgcc aaatagtgtt gattgtgacc cggacattgc tcattgccc 780

gtgtttgcgt tgcattgaca catgtttacg tcgtgttta acaagtatca tgggagggtg 840

atggagtttg attggctggc gcgtaatgtc ttgtgccat ttcaacactt ttgtactat 900
cccataatgg cgggtggcag gttcaatctg tacattcaat cagcattgtt ttggcgtcg 960
aagaacgatg ggcatgcagg aagaacaaca ttggatttga tggcgttcat cggcttcttc 1020
tcttggttag cgggtgctgg gtcatgcac cggagctggc cggagcgtat cgcattcgtc 1080
ttcgtcagcc atgctgtagc tgggttactg aatgtgcaaa tcacactgtc gcacttctct 1140
cggccaatct ttgataccaa caaagaggga cccaggtttg gaggtgactt ttactctcgt 1200
aacgtccttg cttcgttga cgtcgttgt cctacatact tggactgggt ccaaggaggt 1260
ctccaattcc aaacactcca tcattgtac cctagacttg gacgtcagca cttgagaaag 1320
accgaacctc tcattgcac gttgtgaag aagcattctt taccatacac gagcaagagc 1380
ttcgtagagt gcaatatgga agtttttaac acattgaagg atgccgcgcg ttctgccaag 1440
aagtggcac cgtaattta tgagtcaatg tgtgtcagg gatag 1485

<210> 21
<211> 494
<212> PRT
<213> Thalassiosira pseudonana

<400> 21

Met Ala Pro Pro Ser Ile Lys Asp Thr Leu Asp Glu Pro Phe Val Ser
1 5 10 15

Pro Ala Ser Thr Lys Ser Pro Thr Thr Lys Pro Leu Leu Pro Arg Arg
20 25 30

Lys Pro Leu Lys Arg Tyr Ser Pro Ser Gln Ile Ser Gln His Asn Thr
35 40 45

Pro Thr Asp Ala Trp Leu Ile Tyr Lys Ser Gln Val Leu Asp Ile Ser
50 55 60

Lys Trp Ile Ser His His Pro Gly Gly Glu Gln Thr Leu Leu Arg Phe
65 70 75 80

Ala Gly Met Asp Ala Thr Asp Glu Leu Arg Ala Phe His Asp Asp Trp
85 90 95

Val Leu Glu Glu Lys Leu Pro His Phe Val Ile Gly Glu Val Asp Trp
100 105 110

Thr Thr Thr Gly Gly Ala Glu Asn Thr Val Thr Lys Asp Gly Gln Val
115 120 125

Ser Glu Leu Ile Lys Asp Phe Arg Glu Leu Gly Glu His Phe Asp Arg
130 135 140

Leu Gly Tyr Phe His Val Ser Pro Trp Tyr Tyr Val Arg Lys Val Ala
145 150 155 160

Thr Val Phe Ala Ile Phe Gly Cys Ala Leu Gly Leu Leu Phe Asn Thr
165 170 175

Asp Ser Ile Pro Ala His Met Leu Ala Ala Val Leu Leu Gly Ile Phe
180 185 190

Trp Gln Gln Phe Ala Phe Val Gly His Asp Cys Gly His Met Ser Ala
195 200 205

Arg Thr His Ala Arg Asp His Ile Asp Val Pro Lys Leu Gly Ala Leu
210 215 220

Val Thr Phe Phe Asn Gly Ile Ser Val Ala Trp Trp Lys Ala Thr His
225 230 235 240

Asn Val His His Ala Val Pro Asn Ser Val Asp Cys Asp Pro Asp Ile
245 250 255

Ala His Leu Pro Val Phe Ala Leu His Glu His Met Phe Thr Ser Leu
260 265 270

Phe Asn Lys Tyr His Gly Arg Val Met Glu Phe Asp Trp Leu Ala Arg
275 280 285

Asn Val Phe Val Pro Phe Gln His Phe Trp Tyr Tyr Pro Ile Met Ala
290 295 300

Val Ala Arg Phe Asn Leu Tyr Ile Gln Ser Ala Leu Phe Leu Ala Ser
305 310 315 320

Lys Asn Asp Gly His Ala Gly Arg Thr Thr Leu Asp Leu Met Ala Phe
325 330 335

Ile Gly Phe Phe Ser Trp Leu Ala Val Leu Val Ser Cys Ile Pro Ser
340 345 350

Trp Pro Glu Arg Ile Ala Phe Val Phe Val Ser His Ala Val Ala Gly
355 360 365

Leu Leu Asn Val Gln Ile Thr Leu Ser His Phe Ser Arg Pro Ile Phe
370 375 380

Asp Thr Asn Lys Glu Gly Pro Arg Phe Gly Gly Asp Phe Tyr Ser Arg
385 390 395 400

Asn Val Leu Ala Ser Leu Asp Val Ala Cys Pro Thr Tyr Leu Asp Trp
405 410 415

Phe His Gly Gly Leu Gln Phe Gln Thr Leu His His Cys Tyr Pro Arg
420 425 430

Leu Gly Arg Gln His Leu Arg Lys Thr Glu Pro Leu Ile Ala Ser Leu
435 440 445

Cys Lys Lys His Ser Leu Pro Tyr Thr Ser Lys Ser Phe Val Glu Cys
 450 455 460

Asn Met Glu Val Phe Asn Thr Leu Lys Asp Ala Ala Arg Ser Ala Lys
 465 470 475 480

Lys Trp Ser Pro Leu Ile Tyr Glu Ser Met Cys Ala Gln Gly
 485 490

<210> 22
 <211> 16
 <212> DNA
 <213> *Thalassiosira pseudonana*

<400> 22
 ggtaacgaat tgttag 16

<210> 23
 <211> 16
 <212> DNA
 <213> *Thalassiosira pseudonana*

<400> 23
 gtcggcatag ttatg 16

<210> 24
 <211> 21
 <212> DNA
 <213> *Thalassiosira pseudonana*

<400> 24
 gtgagagcac taaccaagct t 21

<210> 25
 <211> 19
 <212> DNA
 <213> *Thalassiosira pseudonana*

<400> 25
 caatcagtag gcttcgctg 19

<210> 26
 <211> 33
 <212> DNA
 <213> *Thalassiosira pseudonana*

<400> 26
 gcgggatcca ccatggctgg aaaaggagga gac 33

<210> 27
 <211> 26
 <212> DNA
 <213> *Thalassiosira pseudonana*

<400> 27
 gcgaattctt acatggcagg gaaatc 26

<210> 28
 <211> 33

<212> DNA
 <213> *Thalassiosira pseudonana*

 <400> 28
 gcgggatcca ccatggctga cttctctcc ggc 33

 <210> 29
 <211> 26
 <212> DNA
 <213> *Thalassiosira pseudonana*

 <400> 29
 gcgaattctc aatcagtagg cttcgt 26

 <210> 30
 <211> 444
 <212> PRT
 <213> *Danio rerio*

 <400> 30

 Met Gly Gly Gly Gly Gln Gln Thr Asp Arg Ile Thr Asp Thr Asn Gly
 1 5 10 15

 Arg Phe Ser Ser Tyr Thr Trp Glu Glu Val Gln Lys His Thr Lys His
 20 25 30

 Gly Asp Gln Trp Val Val Val Glu Arg Lys Val Tyr Asn Val Ser Gln
 35 40 45

 Trp Val Lys Arg His Pro Gly Gly Leu Arg Ile Leu Gly His Tyr Ala
 50 55 60

 Gly Glu Asp Ala Thr Glu Ala Phe Thr Ala Phe His Pro Asn Leu Gln
 65 70 75 80

 Leu Val Arg Lys Tyr Leu Lys Pro Leu Leu Ile Gly Glu Leu Glu Ala
 85 90 95

 Ser Glu Pro Ser Gln Asp Arg Gln Lys Asn Ala Ala Leu Val Glu Asp
 100 105 110

 Phe Arg Ala Leu Arg Glu Arg Leu Glu Ala Glu Gly Cys Phe Lys Thr
 115 120 125

 Gln Pro Leu Phe Phe Ala Leu His Leu Gly His Ile Leu Leu Leu Glu
 130 135 140

 Ala Ile Ala Phe Met Met Val Trp Tyr Phe Gly Thr Gly Trp Ile Asn
 145 150 155 160

 Thr Leu Ile Val Ala Val Ile Leu Ala Thr Ala Gln Ser Gln Ala Gly
 165 170 175

 Trp Leu Gln His Asp Phe Gly His Leu Ser Val Phe Lys Thr Ser Gly
 180 185 190

Met Asn His Leu Val His Lys Phe Val Ile Gly His Leu Lys Gly Ala
195 200 205

Ser Ala Gly Trp Trp Asn His Arg His Phe Gln His His Ala Lys Pro
210 215 220

Asn Ile Phe Lys Lys Asp Pro Asp Val Asn Met Leu Asn Ala Phe Val
225 230 235 240

Val Gly Asn Val Gln Pro Val Glu Tyr Gly Val Lys Lys Ile Lys His
245 250 255

Leu Pro Tyr Asn His Gln His Lys Tyr Phe Phe Phe Ile Gly Pro Pro
260 265 270

Leu Leu Ile Pro Val Tyr Phe Gln Phe Gln Ile Phe His Asn Met Ile
275 280 285

Ser His Gly Met Trp Val Asp Leu Leu Trp Cys Ile Ser Tyr Tyr Val
290 295 300

Arg Tyr Phe Leu Cys Tyr Thr Gln Phe Tyr Gly Val Phe Trp Ala Ile
305 310 315 320

Ile Leu Phe Asn Phe Val Arg Phe Met Glu Ser His Trp Phe Val Trp
325 330 335

Val Thr Gln Met Ser His Ile Pro Met Asn Ile Asp Tyr Glu Lys Asn
340 345 350

Gln Asp Trp Leu Ser Met Gln Leu Val Ala Thr Cys Asn Ile Glu Gln
355 360 365

Ser Ala Phe Asn Asp Trp Phe Ser Gly His Leu Asn Phe Gln Ile Glu
370 375 380

His His Leu Phe Pro Thr Val Pro Arg His Asn Tyr Trp Arg Ala Ala
385 390 395 400

Pro Arg Val Arg Ala Leu Cys Glu Lys Tyr Gly Val Lys Tyr Gln Glu
405 410 415

Lys Thr Leu Tyr Gly Ala Phe Ala Asp Ile Ile Arg Ser Leu Glu Lys
420 425 430

Ser Gly Glu Leu Trp Leu Asp Ala Tyr Leu Asn Lys
435 440

<210> 31
<211> 444
<212> PRT
<213> Homo sapiens

<400> 31

Met Gly Lys Gly Gly Asn Gln Gly Glu Gly Ala Ala Glu Arg Glu Val
1 5 10 15

Ser Val Pro Thr Phe Ser Trp Glu Glu Ile Gln Lys His Asn Leu Arg
20 25 30

Thr Asp Arg Trp Leu Val Ile Asp Arg Lys Val Tyr Asn Ile Thr Lys
35 40 45

Trp Ser Ile Gln His Pro Gly Gly Gln Arg Val Ile Gly His Tyr Ala
50 55 60

Gly Glu Asp Ala Thr Asp Ala Phe Arg Ala Phe His Pro Asp Leu Glu
65 70 75 80

Phe Val Gly Lys Phe Leu Lys Pro Leu Leu Ile Gly Glu Leu Ala Pro
85 90 95

Glu Glu Pro Ser Gln Asp His Gly Lys Asn Ser Lys Ile Thr Glu Asp
100 105 110

Phe Arg Ala Leu Arg Lys Thr Ala Glu Asp Met Asn Leu Phe Lys Thr
115 120 125

Asn His Val Phe Phe Leu Leu Leu Leu Ala His Ile Ile Ala Leu Glu
130 135 140

Ser Ile Ala Trp Phe Thr Val Phe Tyr Phe Gly Asn Gly Trp Ile Pro
145 150 155 160

Thr Leu Ile Thr Ala Phe Val Leu Ala Thr Ser Gln Ala Gln Ala Gly
165 170 175

Trp Leu Gln His Asp Tyr Gly His Leu Ser Val Tyr Arg Lys Pro Lys
180 185 190

Trp Asn His Leu Val His Lys Phe Val Ile Gly His Leu Lys Gly Ala
195 200 205

Ser Ala Asn Trp Trp Asn His Arg His Phe Gln His His Ala Lys Pro
210 215 220

Asn Ile Phe His Lys Asp Pro Asp Val Asn Met Leu His Val Phe Val
225 230 235 240

Leu Gly Glu Trp Gln Pro Ile Glu Tyr Gly Lys Lys Lys Leu Lys Tyr
245 250 255

Leu Pro Tyr Asn His Gln His Glu Tyr Phe Phe Leu Ile Gly Pro Pro
260 265 270

Leu Leu Ile Pro Met Tyr Phe Gln Tyr Gln Ile Ile Met Thr Met Ile
 275 280 285

Val His Lys Asn Trp Val Asp Leu Ala Trp Ala Val Ser Tyr Tyr Ile
 290 295 300

Arg Phe Phe Ile Thr Tyr Ile Pro Phe Tyr Gly Ile Leu Gly Ala Leu
 305 310 315 320

Leu Phe Leu Asn Phe Ile Arg Phe Leu Glu Ser His Trp Phe Val Trp
 325 330 335

Val Thr Gln Met Asn His Ile Val Met Glu Ile Asp Gln Glu Ala Tyr
 340 345 350

Arg Asp Trp Phe Ser Ser Gln Leu Thr Ala Thr Cys Asn Val Glu Gln
 355 360 365

Ser Phe Phe Asn Asp Trp Phe Ser Gly His Leu Asn Phe Gln Ile Glu
 370 375 380

His His Leu Phe Pro Thr Met Pro Arg His Asn Leu His Lys Ile Ala
 385 390 395 400

Pro Leu Val Lys Ser Leu Cys Ala Lys His Gly Ile Glu Tyr Gln Glu
 405 410 415

Lys Pro Leu Leu Arg Ala Leu Leu Asp Ile Ile Arg Ser Leu Lys Lys
 420 425 430

Ser Gly Lys Leu Trp Leu Asp Ala Tyr Leu His Lys
 435 440

<210> 32
 <211> 444
 <212> PRT
 <213> Homo sapiens

<400> 32

Met Ala Pro Asp Pro Val Ala Ala Glu Thr Ala Ala Gln Gly Pro Thr
 1 5 10 15

Pro Arg Tyr Phe Thr Trp Asp Glu Val Ala Gln Arg Ser Gly Cys Glu
 20 25 30

Glu Arg Trp Leu Val Ile Asp Arg Lys Val Tyr Asn Ile Ser Glu Phe
 35 40 45

Thr Arg Arg His Pro Gly Gly Ser Arg Val Ile Ser His Tyr Ala Gly
 50 55 60

Gln Asp Ala Thr Asp Pro Phe Val Ala Phe His Ile Asn Lys Gly Leu
 65 70 75 80

Val Lys Lys Tyr Met Asn Ser Leu Leu Ile Gly Glu Leu Ser Pro Glu
85 90 95

Gln Pro Ser Phe Glu Pro Thr Lys Asn Lys Glu Leu Thr Asp Glu Phe
100 105 110

Arg Glu Leu Arg Ala Thr Val Glu Arg Met Gly Leu Met Lys Ala Asn
115 120 125

His Val Phe Phe Leu Leu Tyr Leu Leu His Ile Leu Leu Leu Asp Gly
130 135 140

Ala Ala Trp Leu Thr Leu Trp Val Phe Gly Thr Ser Phe Leu Pro Phe
145 150 155 160

Leu Leu Cys Ala Val Leu Leu Ser Ala Val Gln Ala Gln Ala Gly Trp
165 170 175

Leu Gln His Asp Phe Gly His Leu Ser Val Phe Ser Thr Ser Lys Trp
180 185 190

Asn His Leu Leu His His Phe Val Ile Gly His Leu Lys Gly Ala Pro
195 200 205

Ala Ser Trp Trp Asn His Met His Phe Gln His His Ala Lys Pro Asn
210 215 220

Cys Phe Arg Lys Asp Pro Asp Ile Asn Met His Pro Phe Phe Phe Ala
225 230 235 240

Leu Gly Lys Ile Leu Ser Val Glu Leu Gly Lys Gln Lys Lys Lys Tyr
245 250 255

Met Pro Tyr Asn His Gln His Lys Tyr Phe Phe Leu Ile Gly Pro Pro
260 265 270

Ala Leu Leu Pro Leu Tyr Phe Gln Trp Tyr Ile Phe Tyr Phe Val Ile
275 280 285

Gln Arg Lys Lys Trp Val Asp Leu Ala Trp Met Ile Thr Phe Tyr Val
290 295 300

Arg Phe Phe Leu Thr Tyr Val Pro Leu Leu Gly Leu Lys Ala Phe Leu
305 310 315 320

Gly Leu Phe Phe Ile Val Arg Phe Leu Glu Ser Asn Trp Phe Val Trp
325 330 335

Val Thr Gln Met Asn His Ile Pro Met His Ile Asp His Asp Arg Asn
340 345 350

Met Asp Trp Val Ser Thr Gln Leu Gln Ala Thr Cys Asn Val His Lys
Page 41

355 360 365
 Ser Ala Phe Asn Asp Trp Phe Ser Gly His Leu Asn Phe Gln Ile Glu
 370 375 380

 His His Leu Phe Pro Thr Met Pro Arg His Asn Tyr His Lys Val Ala
 385 390 395 400

 Pro Leu Val Gln Ser Leu Cys Ala Lys His Gly Ile Glu Tyr Gln Ser
 405 410 415

 Lys Pro Leu Leu Ser Ala Phe Ala Asp Ile Ile His Ser Leu Lys Glu
 420 425 430

 Ser Gly Gln Leu Trp Leu Asp Ala Tyr Leu His Gln
 435 440

 <210> 33
 <211> 439
 <212> PRT
 <213> Thraustochytrium sp.

 <400> 33

 Met Gly Lys Gly Ser Glu Gly Arg Ser Ala Ala Arg Glu Met Thr Ala
 1 5 10 15

 Glu Ala Asn Gly Asp Lys Arg Lys Thr Ile Leu Ile Glu Gly Val Leu
 20 25 30

 Tyr Asp Ala Thr Asn Phe Lys His Pro Gly Gly Ser Ile Ile Asn Phe
 35 40 45

 Leu Thr Glu Gly Glu Ala Gly Val Asp Ala Thr Gln Ala Tyr Arg Glu
 50 55 60

 Phe His Gln Arg Ser Gly Lys Ala Asp Lys Tyr Leu Lys Ser Leu Pro
 65 70 75 80

 Lys Leu Asp Ala Ser Lys Val Glu Ser Arg Phe Ser Ala Lys Glu Gln
 85 90 95

 Ala Arg Arg Asp Ala Met Thr Arg Asp Tyr Ala Ala Phe Arg Glu Glu
 100 105 110

 Leu Val Ala Glu Gly Tyr Phe Asp Pro Ser Ile Pro His Met Ile Tyr
 115 120 125

 Arg Val Val Glu Ile Val Ala Leu Phe Ala Leu Ser Phe Trp Leu Met
 130 135 140

 Ser Lys Ala Ser Pro Thr Ser Leu Val Leu Gly Val Val Met Asn Gly
 145 150 155 160

Ile Ala Gln Gly Arg Cys Gly Trp Val Met His Glu Met Gly His Gly
 165 170 175

Ser Phe Thr Gly Val Ile Trp Leu Asp Asp Arg Met Cys Glu Phe Phe
 180 185 190

Tyr Gly Val Gly Cys Gly Met Ser Gly His Tyr Trp Lys Asn Gln His
 195 200 205

Ser Lys His His Ala Ala Pro Asn Arg Leu Glu His Asp Val Asp Leu
 210 215 220

Asn Thr Leu Pro Leu Val Ala Phe Asn Glu Arg Val Val Arg Lys Val
 225 230 235 240

Lys Pro Gly Ser Leu Leu Ala Leu Trp Leu Arg Val Gln Ala Tyr Leu
 245 250 255

Phe Ala Pro Val Ser Cys Leu Leu Ile Gly Leu Gly Trp Thr Leu Tyr
 260 265 270

Leu His Pro Arg Tyr Met Leu Arg Thr Lys Arg His Met Glu Phe Val
 275 280 285

Trp Ile Phe Ala Arg Tyr Ile Gly Trp Phe Ser Leu Met Gly Ala Leu
 290 295 300

Gly Tyr Ser Pro Gly Thr Ser Val Gly Met Tyr Leu Cys Ser Phe Gly
 305 310 315 320

Leu Gly Cys Ile Tyr Ile Phe Leu Gln Phe Ala Val Ser His Thr His
 325 330 335

Leu Pro Val Thr Asn Pro Glu Asp Gln Leu His Trp Leu Glu Tyr Ala
 340 345 350

Ala Asp His Thr Val Asn Ile Ser Thr Lys Ser Trp Leu Val Thr Trp
 355 360 365

Trp Met Ser Asn Leu Asn Phe Gln Ile Glu His His Leu Phe Pro Thr
 370 375 380

Ala Pro Gln Phe Arg Phe Lys Glu Ile Ser Pro Arg Val Glu Ala Leu
 385 390 395 400

Phe Lys Arg His Asn Leu Pro Tyr Tyr Asp Leu Pro Tyr Thr Ser Ala
 405 410 415

Val Ser Thr Thr Phe Ala Asn Leu Tyr Ser Val Gly His Ser Val Gly
 420 425 430

Ala Asp Thr Lys Lys Gln Asp
 435

<210> 34
<211> 443
<212> PRT
<213> *Caenorhabditis elegans*

<400> 34

Met Val Val Asp Lys Asn Ala Ser Gly Leu Arg Met Lys Val Asp Gly
1 5 10 15

Lys Trp Leu Tyr Leu Ser Glu Glu Leu Val Lys Lys His Pro Gly Gly
20 25 30

Ala Val Ile Glu Gln Tyr Arg Asn Ser Asp Ala Thr His Ile Phe His
35 40 45

Ala Phe His Glu Gly Ser Ser Gln Ala Tyr Lys Gln Leu Asp Leu Leu
50 55 60

Lys Lys His Gly Glu His Asp Glu Phe Leu Glu Lys Gln Leu Glu Lys
65 70 75 80

Arg Leu Asp Lys Val Asp Ile Asn Val Ser Ala Tyr Asp Val Ser Val
85 90 95

Ala Gln Glu Lys Lys Met Val Glu Ser Phe Glu Lys Leu Arg Gln Lys
100 105 110

Leu His Asp Asp Gly Leu Met Lys Ala Asn Glu Thr Tyr Phe Leu Phe
115 120 125

Lys Ala Ile Ser Thr Leu Ser Ile Met Ala Phe Ala Phe Tyr Leu Gln
130 135 140

Tyr Leu Gly Trp Tyr Ile Thr Ser Ala Cys Leu Leu Ala Leu Ala Trp
145 150 155 160

Gln Gln Phe Gly Trp Leu Thr His Glu Phe Cys His Gln Gln Pro Thr
165 170 175

Lys Asn Arg Pro Leu Asn Asp Thr Ile Ser Leu Phe Phe Gly Asn Phe
180 185 190

Leu Gln Gly Phe Ser Arg Asp Trp Trp Lys Asp Lys His Asn Thr His
195 200 205

His Ala Ala Thr Asn Val Ile Asp His Asp Gly Asp Ile Asp Leu Ala
210 215 220

Pro Leu Phe Ala Phe Ile Pro Gly Asp Leu Cys Lys Tyr Lys Ala Ser
225 230 235 240

Phe Glu Lys Ala Ile Leu Lys Ile Val Pro Tyr Gln His Leu Tyr Phe

245 250 255

Thr Ala Met Leu Pro Met Leu Arg Phe Ser Trp Thr Gly Gln Ser Val
260 265 270

Gln Trp Val Phe Lys Glu Asn Gln Met Glu Tyr Lys Val Tyr Gln Arg
275 280 285

Asn Ala Phe Trp Glu Gln Ala Thr Ile Val Gly His Trp Ala Trp Val
290 295 300

Phe Tyr Gln Leu Phe Leu Leu Pro Thr Trp Pro Leu Arg Val Ala Tyr
305 310 315 320

Phe Ile Ile Ser Gln Met Gly Gly Gly Leu Leu Ile Ala His Val Val
325 330 335

Thr Phe Asn His Asn Ser Val Asp Lys Tyr Pro Ala Asn Ser Arg Ile
340 345 350

Leu Asn Asn Phe Ala Ala Leu Gln Ile Leu Thr Thr Arg Asn Met Thr
355 360 365

Pro Ser Pro Phe Ile Asp Trp Leu Trp Gly Gly Leu Asn Tyr Gln Ile
370 375 380

Glu His His Leu Phe Pro Thr Met Pro Arg Cys Asn Leu Asn Ala Cys
385 390 395 400

Val Lys Tyr Val Lys Glu Trp Cys Lys Glu Asn Asn Leu Pro Tyr Leu
405 410 415

Val Asp Asp Tyr Phe Asp Gly Tyr Ala Met Asn Leu Gln Gln Leu Lys
420 425 430

Asn Met Ala Glu His Ile Gln Ala Lys Ala Ala
435 440

<210> 35

<211> 443

<212> PRT

<213> Caenorhabditis elegans

<400> 35

Met Val Val Asp Lys Asn Ala Ser Gly Leu Arg Met Lys Val Asp Gly
1 5 10 15

Lys Trp Leu Tyr Leu Ser Glu Glu Leu Val Lys Lys His Pro Gly Gly
20 25 30

Ala Val Ile Glu Gln Tyr Arg Asn Ser Asp Ala Thr His Ile Phe His
35 40 45

Ala Phe His Glu Gly Ser Ser Gln Ala Tyr Lys Gln Leu Asp Leu Leu
50 55 60

Lys Lys His Gly Glu His Asp Glu Phe Leu Glu Lys Gln Leu Glu Lys
65 70 75 80

Arg Leu Asp Lys Val Asp Ile Asn Val Ser Ala Tyr Asp Val Ser Val
85 90 95

Ala Gln Glu Lys Lys Met Val Glu Ser Phe Glu Lys Leu Arg Gln Lys
100 105 110

Leu His Asp Asp Gly Leu Met Lys Ala Asn Glu Thr Tyr Phe Leu Phe
115 120 125

Lys Ala Ile Ser Thr Leu Ser Ile Met Ala Phe Ala Phe Tyr Leu Gln
130 135 140

Tyr Leu Gly Trp Tyr Ile Thr Ser Ala Cys Leu Leu Ala Leu Ala Trp
145 150 155 160

Gln Gln Phe Gly Trp Leu Thr His Glu Phe Cys His Gln Gln Pro Thr
165 170 175

Lys Asn Arg Pro Leu Asn Asp Thr Ile Ser Leu Phe Phe Gly Asn Phe
180 185 190

Leu Gln Gly Phe Ser Arg Asp Trp Trp Lys Asp Lys His Asn Thr His
195 200 205

His Ala Ala Thr Asn Val Ile Asp His Asp Gly Asp Ile Asp Leu Ala
210 215 220

Pro Leu Phe Ala Phe Ile Pro Gly Asp Leu Cys Lys Tyr Lys Ala Ser
225 230 235 240

Phe Glu Lys Ala Ile Leu Lys Ile Val Pro Tyr Gln His Leu Tyr Phe
245 250 255

Thr Ala Met Leu Pro Met Leu Arg Phe Ser Trp Thr Gly Gln Ser Val
260 265 270

Gln Trp Val Phe Lys Glu Asn Gln Met Glu Tyr Lys Val Tyr Gln Arg
275 280 285

Asn Ala Phe Trp Glu Gln Ala Thr Ile Val Gly His Trp Ala Trp Val
290 295 300

Phe Tyr Gln Leu Phe Leu Leu Pro Thr Trp Pro Leu Arg Val Ala Tyr
305 310 315 320

Phe Ile Ile Ser Gln Met Gly Gly Gly Leu Leu Ile Ala His Val Val
325 330 335

Thr Phe Asn His Asn Ser Val Asp Lys Tyr Pro Ala Asn Ser Arg Ile
340 345 350

Leu Asn Asn Phe Ala Ala Leu Gln Ile Leu Thr Thr Arg Asn Met Thr
355 360 365

Pro Ser Pro Phe Ile Asp Trp Leu Trp Gly Gly Leu Asn Tyr Gln Ile
370 375 380

Glu His His Leu Phe Pro Thr Met Pro Arg Cys Asn Leu Asn Ala Cys
385 390 395 400

Val Lys Tyr Val Lys Glu Trp Cys Lys Glu Asn Asn Leu Pro Tyr Leu
405 410 415

Val Asp Asp Tyr Phe Asp Gly Tyr Ala Met Asn Leu Gln Gln Leu Lys
420 425 430

Asn Met Ala Glu His Ile Gln Ala Lys Ala Ala
435 440

<210> 36
<211> 419
<212> PRT
<213> Euglena gracilis

<400> 36

Met Lys Ser Lys Arg Gln Ala Leu Ser Pro Leu Gln Leu Met Glu Gln
1 5 10 15

Thr Tyr Asp Val Val Asn Phe His Pro Gly Gly Ala Glu Ile Ile Glu
20 25 30

Asn Tyr Gln Gly Arg Asp Ala Thr Asp Ala Phe Met Val Met His Phe
35 40 45

Gln Glu Ala Phe Asp Lys Leu Lys Arg Met Pro Lys Ile Asn Pro Ser
50 55 60

Phe Glu Leu Pro Pro Gln Ala Ala Val Asn Glu Ala Gln Glu Asp Phe
65 70 75 80

Arg Lys Leu Arg Glu Glu Leu Ile Ala Thr Gly Met Phe Asp Ala Ser
85 90 95

Pro Leu Trp Tyr Ser Tyr Lys Ile Ser Thr Thr Leu Gly Leu Gly Val
100 105 110

Leu Gly Tyr Phe Leu Met Val Gln Tyr Gln Met Tyr Phe Ile Gly Ala
115 120 125

Val Leu Leu Gly Met His Tyr Gln Gln Met Gly Trp Leu Ser His Asp
Page 47

130 135 140

Ile Cys His His Gln Thr Phe Lys Asn Arg Asn Trp Asn Asn Leu Val
145 150 155 160

Gly Leu Val Phe Gly Asn Gly Leu Gln Gly Phe Ser Val Thr Cys Trp
165 170 175

Lys Asp Arg His Asn Ala His His Ser Ala Thr Asn Val Gln Gly His
180 185 190

Asp Pro Asp Ile Asp Asn Leu Pro Pro Leu Ala Trp Ser Glu Asp Asp
195 200 205

Val Thr Arg Ala Ser Pro Ile Ser Arg Lys Leu Ile Gln Phe Gln Gln
210 215 220

Tyr Tyr Phe Leu Val Ile Cys Ile Leu Leu Arg Phe Ile Trp Cys Phe
225 230 235 240

Gln Cys Val Leu Thr Val Arg Ser Leu Lys Asp Arg Asp Asn Gln Phe
245 250 255

Tyr Arg Ser Gln Tyr Lys Lys Glu Ala Ile Gly Leu Ala Leu His Trp
260 265 270

Thr Leu Lys Ala Leu Phe His Leu Phe Phe Met Pro Ser Ile Leu Thr
275 280 285

Ser Leu Leu Val Phe Phe Val Ser Glu Leu Val Gly Gly Phe Gly Ile
290 295 300

Ala Ile Val Val Phe Met Asn His Tyr Pro Leu Glu Lys Ile Gly Asp
305 310 315 320

Pro Val Trp Asp Gly His Gly Phe Ser Val Gly Gln Ile His Glu Thr
325 330 335

Met Asn Ile Arg Arg Gly Ile Ile Thr Asp Trp Phe Phe Gly Gly Leu
340 345 350

Asn Tyr Gln Ile Glu His His Leu Trp Pro Thr Leu Pro Arg His Asn
355 360 365

Leu Thr Ala Val Ser Tyr Gln Val Glu Gln Leu Cys Gln Lys His Asn
370 375 380

Leu Pro Tyr Arg Asn Pro Leu Pro His Glu Gly Leu Val Ile Leu Leu
385 390 395 400

Arg Tyr Leu Ala Val Phe Ala Arg Met Ala Glu Lys Gln Pro Ala Gly
405 410 415

Lys Ala Leu

<210> 37

<211> 477

<212> PRT

<213> *Phaeodactylum tricornutum*

<400> 37

Met Gly Lys Gly Gly Asp Ala Arg Ala Ser Lys Gly Ser Thr Ala Ala
1 5 10 15

Arg Lys Ile Ser Trp Gln Glu Val Lys Thr His Ala Ser Pro Glu Asp
20 25 30

Ala Trp Ile Ile His Ser Asn Lys Val Tyr Asp Val Ser Asn Trp His
35 40 45

Glu His Pro Gly Gly Ala Val Ile Phe Thr His Ala Gly Asp Asp Met
50 55 60

Thr Asp Ile Phe Ala Ala Phe His Ala Pro Gly Ser Gln Ser Leu Met
65 70 75 80

Lys Lys Phe Tyr Ile Gly Glu Leu Leu Pro Glu Thr Thr Gly Lys Glu
85 90 95

Pro Gln Gln Ile Ala Phe Glu Lys Gly Tyr Arg Asp Leu Arg Ser Lys
100 105 110

Leu Ile Met Met Gly Met Phe Lys Ser Asn Lys Trp Phe Tyr Val Tyr
115 120 125

Lys Cys Leu Ser Asn Met Ala Ile Trp Ala Ala Ala Cys Ala Leu Val
130 135 140

Phe Tyr Ser Asp Arg Phe Trp Val His Leu Ala Ser Ala Val Met Leu
145 150 155 160

Gly Thr Phe Phe Gln Gln Ser Gly Trp Leu Ala His Asp Phe Leu His
165 170 175

His Gln Val Phe Thr Lys Arg Lys His Gly Asp Leu Gly Gly Leu Phe
180 185 190

Trp Gly Asn Leu Met Gln Gly Tyr Ser Val Gln Trp Trp Lys Asn Lys
195 200 205

His Asn Gly His His Ala Val Pro Asn Leu His Cys Ser Ser Ala Val
210 215 220

Ala Gln Asp Gly Asp Pro Asp Ile Asp Thr Met Pro Leu Leu Ala Trp
225 230 235 240

Ser Val Gln Gln Ala Gln Ser Tyr Arg Glu Leu Gln Ala Asp Gly Lys
245 250 255

Asp Ser Gly Leu Val Lys Phe Met Ile Arg Asn Gln Ser Tyr Phe Tyr
260 265 270

Phe Pro Ile Leu Leu Leu Ala Arg Leu Ser Trp Leu Asn Glu Ser Phe
275 280 285

Lys Cys Ala Phe Gly Leu Gly Ala Ala Ser Glu Asn Ala Ala Leu Glu
290 295 300

Leu Lys Ala Lys Gly Leu Gln Tyr Pro Leu Leu Glu Lys Ala Gly Ile
305 310 315 320

Leu Leu His Tyr Ala Trp Met Leu Thr Val Ser Ser Gly Phe Gly Arg
325 330 335

Phe Ser Phe Ala Tyr Thr Ala Phe Tyr Phe Leu Thr Ala Thr Ala Ser
340 345 350

Cys Gly Phe Leu Leu Ala Ile Val Phe Gly Leu Gly His Asn Gly Met
355 360 365

Ala Thr Tyr Asn Ala Asp Ala Arg Pro Asp Phe Trp Lys Leu Gln Val
370 375 380

Thr Thr Thr Arg Asn Val Thr Gly Gly His Gly Phe Pro Gln Ala Phe
385 390 395 400

Val Asp Trp Phe Cys Gly Gly Leu Gln Tyr Gln Val Asp His His Leu
405 410 415

Phe Pro Ser Leu Pro Arg His Asn Leu Ala Lys Thr His Ala Leu Val
420 425 430

Glu Ser Phe Cys Lys Glu Trp Gly Val Gln Tyr His Glu Ala Asp Leu
435 440 445

Val Asp Gly Thr Met Glu Val Leu His His Leu Gly Ser Val Ala Gly
450 455 460

Glu Phe Val Val Asp Phe Val Arg Asp Gly Pro Ala Met
465 470 475

<210> 38
<211> 404
<212> PRT
<213> Borago officinalis

<400> 38

Ser Phe Pro Leu Lys Ser Leu Ala Gly Gln Glu Val Thr Asp Ala Phe
Page 50

1	5	10	15
Val Ala Phe His Pro Ala Ser Thr Trp Lys Asn Leu Asp Lys Phe Phe			
	20	25	30
Thr Gly Tyr Tyr Leu Lys Asp Tyr Ser Val Ser Glu Val Ser Lys Asp			
	35	40	45
Tyr Arg Lys Leu Val Phe Glu Phe Ser Lys Met Gly Leu Tyr Asp Lys			
	50	55	60
Lys Gly His Ile Met Phe Ala Thr Leu Cys Phe Ile Ala Met Leu Phe			
	65	70	75
			80
Ala Met Ser Val Tyr Gly Val Leu Phe Cys Glu Gly Val Leu Val His			
	85	90	95
Leu Phe Ser Gly Cys Leu Met Gly Phe Leu Trp Ile Gln Ser Gly Trp			
	100	105	110
Ile Gly His Asp Ala Gly His Tyr Met Val Val Ser Asp Ser Arg Leu			
	115	120	125
Asn Lys Phe Met Gly Ile Phe Ala Ala Asn Cys Leu Ser Gly Ile Ser			
	130	135	140
Ile Gly Trp Trp Lys Trp Asn His Asn Ala His His Ile Ala Cys Asn			
	145	150	155
			160
Ser Leu Glu Tyr Asp Pro Asp Leu Gln Tyr Ile Pro Phe Leu Val Val			
	165	170	175
Ser Ser Lys Phe Phe Gly Ser Leu Thr Ser His Phe Tyr Glu Lys Arg			
	180	185	190
Leu Thr Phe Asp Ser Leu Ser Arg Phe Phe Val Ser Tyr Gln His Trp			
	195	200	205
Thr Phe Tyr Pro Ile Met Cys Ala Ala Arg Leu Asn Met Tyr Val Gln			
	210	215	220
Ser Leu Ile Met Leu Leu Thr Lys Arg Asn Val Ser Tyr Arg Ala His			
	225	230	235
			240
Glu Leu Leu Gly Cys Leu Val Phe Ser Ile Trp Tyr Pro Leu Leu Val			
	245	250	255
Ser Cys Leu Pro Asn Trp Gly Glu Arg Ile Met Phe Val Ile Ala Ser			
	260	265	270
Leu Ser Val Thr Gly Met Gln Gln Val Gln Phe Ser Leu Asn His Phe			
	275	280	285

Ser Ser Ser Val Tyr Val Gly Lys Pro Lys Gly Asn Asn Trp Phe Glu
290 295 300

Lys Gln Thr Asp Gly Thr Leu Asp Ile Ser Cys Pro Pro Trp Met Asp
305 310 315 320

Trp Phe His Gly Gly Leu Gln Phe Gln Ile Glu His His Leu Phe Pro
325 330 335

Lys Met Pro Arg Cys Asn Leu Arg Lys Ile Ser Pro Tyr Val Ile Glu
340 345 350

Leu Cys Lys Lys His Asn Leu Pro Tyr Asn Tyr Ala Ser Phe Ser Lys
355 360 365

Ala Asn Glu Met Thr Leu Arg Thr Leu Arg Asn Thr Ala Leu Gln Ala
370 375 380

Arg Asp Ile Thr Lys Pro Leu Pro Lys Asn Leu Val Trp Glu Ala Leu
385 390 395 400

His Thr His Gly